EXHIBIT 2b

Part 2 of 2

https://www.navigantresearch.com/blog/no-love-for-utilities-in-fcc-spectrum-auctions

No Love for Utilities in FCC Spectrum Auctions

Richelle Elberg — November 26, 2014

As a wireless industry analyst who spent years following the FCC's monetization of spectrum via competitive auctions, I've been struck by the dramatic increase in spectrum values implied by the ongoing Advanced Wireless Services (AWS) Auction in Washington, D.C.

The sale of more than 1,600 licenses nationwide, which began November 13, has now raised more than $38 billion – a tally that has risen by more than $2 billion since I started writing this blog! That's 2 to 3 times the total analysts were calling for prior to the sale and implies values of more than **$2** per megahertz per population unit (MHz POP) for paired licenses; some large markets are already going for **$5** per MHz POP.

(Value per MHz POP is a metric commonly used to compare the values of various spectrum licenses; it is equal to the price of the license divided by the total number of MHz for a given license divided by the population of the licensed market. Paired licenses come with two swaths of spectrum, one each for uplink and downlink, and are typically more valuable than unpaired licenses, which have only one spectrum swath. For detail on the licenses currently up for sale, click here.)

To put that in perspective, in the last major spectrum auction, held in **2008**, spectrum values leveled off at **$1.22** per MHz POP. And while the bidding is blind – we don't know which companies currently hold the top slot for which licenses – rest assured that Verizon and AT&T are near the top of that list. Smartphone penetration and data usage have grown stunningly over the past 6 years, and the top wireless carriers are willing to pay (almost) any price to ensure they can continue to meet demand. Without adequate spectrum, they simply won't be able to keep up.

What about the Grid?

In my current role, as a smart grid communications analyst, I can't help but wonder what happened to the FCC's oft-discussed plans to allocate spectrum to electric utilities for smart grid connectivity. Proceeds from the current auction will go to support build out of a nationwide public safety communications network at 700 MHz; public safety

organizations were awarded those licenses, free of charge, a few years ago. The so-called FirstNet initiative is expected to provide interoperable communications for first responders (police, fire, EMTs) – but apparently, the FCC doesn't consider the electric grid to be critical to public safety.

The Utilities Telecom Council (UTC) has lobbied for years to convince the Commission that the power grid nationwide is critical infrastructure, and that utilities struggling to make upgrades to ensure improved reliability and efficiency are in need of dedicated spectrum to enable the communications between new grid devices. But it appears the last time the FCC seriously considered such a move was in 2012. At that time, the Commission was dismayed by the underuse of 4.9 GHz unlicensed spectrum and considered awarding the licenses to utilities. But in the end, it didn't. In 2009, the UTC asked for 30 MHz of dedicated spectrum, also to no avail.

The DIY Option

Some utilities have owned their own spectrum licenses in the past – but that was the exception, not the rule. San Diego Gas & Electric had plans to build its own communications network using wireless communications services (WCS) spectrum a few years back, but it opted instead to sell the licenses for the San Diego market to AT&T. Many utilities across the United States have used unlicensed **900 MHz** spectrum for their smart meter deployments, and many cooperative utilities own licenses for the **220 MHz** band. Smart grid networking system vendor Tantalus offers a system that leverages that spectrum for connectivity in difficult terrain.

But utilities have been left on the sidelines as the government works to maximize spectrum utilization, promote rural broadband access, and ensure public safety organizations have the communications they need in times of disaster. But a resilient, reliable, efficient power grid plays a major role in our nation's ability to respond to natural and man-made disasters. That would seem to be worthy of dedicated spectrum.

DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 3

Cooperative High-Accuracy Location (C-HALO) service for Intelligent Transportation Systems: A Cost Benefit Study

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BIOGRAPHY

Adam Goodliss graduated with a Masters of Engineering Degree in December 2010 from the University of California, Berkeley's Institute for Transportation Studies encompassed by the Civil and Environmental Engineering Department. Currently Adam is a Management Consultant at Oliver Wyman and has worked on engagements within the Aviation and Retail industries.

Dr. Christian Manasseh graduated with a PhD in December 2010 from the University of California, Berkeley's Institute for Transportation Studies encompassed by the Civil and Environmental Engineering Department. He currently works for a privately owned start-up company.

Venkatesan Ekambaram is a PhD student at the Department of EECS, University of California, Berkeley since August 2009. He received his Masters from the Indian Institute of Science, Bangalore, India in July 2008.. His research interests are in the area of peer-to-pcer networks, signal processing for wireless communications and intelligent transportation systems. He is a co-recipient of the best paper award in the algorithms track IEEE/ACM DCOSS'08

Dr. Raja Sengupta is currently Associate Professor in the Systems program of the department of Civil and Environmental Engineering at the University of California at Berkeley. He received his Ph.D. from the EECS department of the University of Michigan, at Ann Arbor. His current research interests are in DSRC, networked estimation and control, vision based control of unmanned air vehicles, and collaborative behavior in robotic systems. He has served as Associate Editor of the IEEE Control Systems magazine and of the Journal of Intelligent Transportation Systems. He was Program Chair of the IEEE Conference on Autonomous Intelligent Networked Systems 2003 and Co-General Chair of the first ACM MOBICOM Workshop on Vehicular Ad-hoc Networks held in 2004, Co-Chair of the Program Committee for the second ACM MOBICOM Workshop on Vehicular Ad-hoc Networks held in 2005, Program Chair for the First International Symposium on Vehicular Computing Systems 2008, and will be Co-General Chair or IEEE WIVEC 2011.

Dr. Kannan Ramchandran received his Ph.D. from Columbia University in 1993. He is a Professor in the Department of Electrical Engineering and Computer Science of the University of California at Berkeley. His research group is the BASiCS group. Between 1993 and 1999 he was on the faculty of the Department of Electrical and Computer Engineering and the Coordinated Science Lab (CSL) at UIUC and a full-time Beckman Institute faculty member in the Image Formation and Processing Group. His fields of professional interest are communication and information theory, networking, image and video compression and modeling, multirate and multiresolutional signal processing, wavelets, robust image and video communication, packet video, and fast algorithms for signal and image processing.

ABSTRACT

This paper presents a cost benefit study of a Cooperative High-Accuracy LOcation (C-HALO) service as a nationwide service capable of providing decimeter level positioning accuracy to enable several new applications across various industries. We survey and summarize work by others quantifying the benefits reaped from enabling applications that require C-HALO. However, benefits to the economy from enabling C-HALO for Intelligent Transportation Systems (ITS) have not been quantified in the literature. This study estimates these benefits. We also provide an order of magnitude rough estimate of the cost of implementing part of a C-HALO infrastructure based on N-RTK technology.

Given the assumptions presented in the paper, our estimate of the benefits of a C-HALO service to ITS applications is on the order of $160 billion to $320 billion

over a time horizon of 22 years. This translates into 1.1 to 2.2 percent of the US GDP. After researching several local and state-based deployments of C-HALO services, we picked N-RTK as one nascent technology to partially deploy C-HALO nationwide. We assess the current cost to be $560,000 to $1.6 million per base station covering a 60x60 sq.km area. A rough calculation yields a total cost of implementation to be between $1.6 billion to $4.4 billion. We conclude that the benefits for implementing a nationwide C-HALO service far outweigh the costs of deployment.

INTRODUCTION

High accuracy positioning is mandated for many applications and there has been considerable efforts taken to develop infrastructure for enabling precise localization. The largest of these is the global positioning system (GPS) that has been developed and deployed by the US government. Other GNSS are being upgraded (GLONASS) and established (Galileo, etc.) Extending the coverage, accuracy and reliability of GPS (GPS herein meaning all available GNSS) has been, for years, the objective of much private sector research and deployment efforts. For example, technologies such as DGPS [1], GPS-WAAS, GPS+INS, GPS-RTK, and Network RTK [2] have been developed in recent years and are partially deployed. Limited-coverage pseudolite-based systems are also available and wide-area multi-lateration systems are being substantially deployed around airports for aircraft and ground vehicle tracking. However, to this day no system has been proven to be able to ubiquitously provide accurate and reliable wide-area positioning information approaching what is needed for C-HALO. In most cases, such as with GPS-RTK, the cost of the positioning system in their limited uses (such as high-end agriculture and surveying), has been a barrier to wider-scale deployment. Moreover, these technologies rely on GPS, and only work well in areas where GPS reception is not weak or compromised by substantial radio multipath. In areas such as urban canyons and forested streets, or even in traffic with many adjacent vehicles passing by, these systems may not function well. Certain new pseudolite-based solutions, which can cover these dark areas are limited in range and are "not yet ready for prime time." Inertial navigation systems (INS) in vehicles can extend GPS coverage beyond areas of accuracy but not for substantial distances before loss of required accuracy. Wide-area multi-lateration systems being increasingly deployed around airports (as noted above) are cost-effective and sufficiently accurate for their purposes, but without modifications and far more extensive use of base stations, will not meet C-HALO requirements.

Combinations of multiple technologies will be needed for C-HALO, and phases seem needed for affordable, practical implementation, starting with higher value applications in geographic areas that can be affordably covered with sufficient accuracy and reliability, to eventual nationwide coverage, higher performance, higher volumes and lower per-unit cost, and an increasing range of applications extending to the mass market. In addition to technological difficulties, deployment of C-HALO on the scale planned requires significant government support and funding. This has discouraged the private sector from aggressively attempting to resolve the technological issues. Overcoming the current technological hurdles and enabling C-HALO; therefore, warrants government and private foundation support of research and development initiatives. This study aims at providing a tool, which will enable government and private funding agencies to assess the benefits of investing in a new breed of positioning technologies and wide-scale deployments to meet the goals first noted above.

To assess the benefits for ITS, we first identify new information services sought by society and enabled by a C-HALO capability. We then quantify the benefits of these services. Examples of such services include smart systems to manage infrastructure elements such as traffic signal corridors and applications for collision warning etc. A large group of such services have been identified by the different administrations of the USDOT over the past twenty years, advanced by the academic community and the ITS industry, and comprehensively managed at the policy level by the ITS-JPO (Intelligent Transportation Systems Joint Program Office). A subset of these services work only when the location information is good enough to know the lanes of travel of vehicles, i.e. positioning to a decimeter precision. We assume most such services require C-HALO. Accordingly the benefits of such a service, as evaluated in this study of the literature, are assigned to C-HALO.

The ITS benefits accrued from a C-HALO service are projected in direct relation to the added safety and mobility on the roadway. ITS applications that require high accuracy in locating vehicles and infrastructure elements are identified and their efficiency in reducing accidents and congestion is estimated based on published literature. These numbers are then used to project the monetary benefits over the next 22 years by assuming a cost of human life and a discount rate among other factors. We also assume an adoption curve for the new technology that assumes some government ownership in the roll-out process of the technology. Given the assumptions presented in the report, our estimate of the benefits of a C-HALO service to ITS applications is on the order of $160 billion to $320 billion. The range depends on whether one uses the low-level or the mid-level efficacy rates in reducing accidents using ITS safety applications. This translates into 1.1 to 2.2 percent of the US GDP.

After researching several local and state-based deployments of C-HALO services, we picked N-RTK as one nascent technology to partially deploy C-HALO nationwide. We assess the current cost to be $560,000 to $1.6 million per base station covering a 60x60 sq.km area. A rough estimate for a nation wide deployment yields a cost of $1.6 billion to $4.4 billion.

In the sections to follow we present a literature review and the methodology used to estimate the benefits and costs.

LITERATURE SUMMARY

We have reviewed existing GNSS related market analyses and cost benefit studies done by others on various sectors of the economy and in various parts of the globe. This section summarizes our findings.

Market Analysis

Rob Lorimer of Position One Consulting performed a three year projection on the GNSS global market in his report titled: GNSS Market Research and Analysis September 2008 [3]. Based on this report and analysis, we created a table of global positioning companies, along with which industry(ies) each company is involved in. The complete table is included in the technical report [4].

The table identifies the three most ubiquitous providers of GNSS-based services as Leica Geosystems, Trimble, and TopCon/Sokkia. Omnistar is also relevant in many industries, but they are mainly focused on precision augmentation services, while the other three are more vertically integrated, and typically incorporate numerous levels of the value chain. Interviews conducted by Lorimer with the CEO's of the companies listed in the table provided insight into the industries that are major consumers of location services. The biggest consumers are the Aerospace, Agriculture, Autonomous Vehicles, Construction, Defense, Maritime, Mining, and Surveying industries. Clearly void from this list is the transportation sector, which we choose to analyze as part of this CBA. Benefit estimates have been completed in some of these industries and are discussed in more detail in the subsequent section.

Published Benefit Analysis Reports of Various GNSS

The Allen Group [5] estimated the economic benefits of C-HALO type technology in three specific Australian industries: Agriculture, Mining, and Construction. The Allen Group determined the benefits to be between $100 and $200 billion, approximately 10 to 20 percent of the Australian GDP. These three markets make up approximately 10 to 13 percent of the GDP. Assuming that the U.S. transportation market makes up 5 percent of the GDP, a simple linear scaling of the Allen Group's numbers suggests the HALO benefits derived from the transportation sector alone should be 4 to 9 percent of the GDP, which would be approximately $560 to $1200 billion in benefits. We find $160 to 300 billion. These benefit numbers appear conservative in relation to the Allen Group study. We have incorporated a key piece of the Allen Group report in our method. The adoption rate for the C-HALO technology is represented by this studies' industry-wide national rollout adoption scenario.

A socio-economic benefit study was commissioned by US Department of Commerce (DoC) [6] to determine where there is value added by the CORS and GRAV-D systems. The study focused on the benefits derived from the increased vertical accuracy of GPS. We do not consider this dimension at all. The study suggests that the surveying and mapping industry will be the most significantly impacted, but goes on to list other possible industries like construction, agriculture, environmental science, and transportation. Again this reiterates the fact that researchers are continuing to view transportation as a realm for potential benefits from C-HALO technology. The US DoC study assesses benefits utilizing the productivity methodology, which is typical and similar to the methodology used in our study and many others contained in the literature review. One slight difference to our methodology is that their time horizon is 15 years while ours is 22 years.

Alcantarilla, et al. analyze the benefits of a multi-constellation system, versus a stand-alone GNSS system, and ultimately a SBAS approach [7]. A piece that may be of importance to us when discussing the costs is the distribution of the number of satellites in view. They conduct a simulation of an urban environment and contend that with GPS & Galileo 65% of the area is covered by more than 3 satellites, while 20% is covered by 3, and 15% by less than 3. They then go on to qualitatively discuss the principal pieces of a future GPS system along with the envisioned benefits of multi-constellation GNSS SBAS augmentations. Similar analysis is carried out by Zabic et al. [8] but with actual data in Copenhagen. They estimate the average satellite availabity in Copenhagen through extensive data collection and use simulation tools to predict the improvement in satellite availability with the addition of Galileo.

Swann, et al. discuss the qualitative benefits of location-based services, the architectural issues involved in multi-constellation systems, and the market aspects that need to be addressed for deploying multi-constellation systems [9]. They focus on the benefits of reliability of a combined GPS/Galileo signal where availability is at 99.7% in their Stuttgart analysis. In addition, they estimate the GNSS service provision market to be 135

billion Euros by 2015 with a significant portion of that residing in the transportation industry. This is significantly higher than what Lorimer's report quotes for the U.S. market by 2012, which is around $9 billion.

Vollath, et al. aimed to look at how NRTK and the third frequency to be offered by Galileo will interact [10]. They present the value of the Galileo third frequency in facilitating higher horizontal accuracy and increased distances between base stations among other things. NRTK, however, still proves to be more accurate in the vertical direction. Ultimately, they do not assess the monetary benefits, but only the technical reliability. They conclude that NRTK will not be replaced by the Galileo new third frequency, but that the two could be used as complimentary technologies.

Arthur, et al. delve deeper into the impacts of Galileo by going beyond cost benefit analyses and conducting specific input-output models [11] which actually predict economic output rather than just analyzing costs and benefits. They even go as far to suggest that some 'market externality' impacts, like induced effects, could be twice as large as the direct impacts. They also suggest how to enhance a CBA by including innovation effects (through supply-push or demand-pull forces), or market and social externalities. These types of analyses could be worthwhile as future work. They are not included in this report.

Brennan, et al. wrote National PNT Architecture: Interim Results to facilitate the decision making process on a national PNT architecture for the United States by 2025 [12]. It does not focus on costs or benefits in quantitative terms. It does however evaluate many different technological options to achieve their stated goals. Ultimately, they want to put together a transition plan from an "as is" architecture to a "should be" architecture. Unfortunately, this is not directly related to our CBA.

Existing C-HALO Type Deployments

In order to understand the existing C-HALO deployments and technologies, we reviewed the initiatives undertaken by the government agencies. The material here is based on reports [13] and [14] provided by the Federal Highway Authority. The earliest deployments were the Differential GPS (DGPS) base stations by the US Coast Guard for maritime services. These base stations broadcast the actual and measured pseudo-range differences of the received code measurements from the different satellites. These error measurements are used by GPS receivers to calibrate their own measurements resulting in accuracies as high as 1m under good line-of-sight conditions. The corrections are broadcast typically in the longwave frequency range between 285kHz and 325kHz. The U.S. Army Corps of Engineers (USACOE) later realized the benefits of accurate localization and efforts were made to increase the coverage of the DGPS base stations. This resulted in the N-DGPS or nationwide DGPS program under which a total of around 137 base stations were to be installed nationwide to provide accurate localization services. The defense establishment also found need for decimeter and centimeter level accuracies. This could be obtained by sending corrections to the carrier phase received by the DGPS stations, as the carrier frequency of GPS is 1000 times higher than the frequency of the modulated code sequence. Hence one could obtain very high accuracies by measuring the carrier phase. This technology came to be known as RTK or Real Time Kinematic positioning and the proposed system implementation by government agencies has come to be known as HA-NDGPS – High Accuracy NDGPS [13].

One of the challenges of HA-NDGPS is that the allocated bandwidth does not suffice for broadcasting the carrier measurements for all the satellites [14]. This requires compression of the phase measurements. This work is still in progress. Prototypes of this system were deployed and evaluated [13]. During deployment it was found that, if a receiver obtained corrections from more than one base station, a combination of the measurements provided higher accuracies. A more sophisticated combination could provide still higher accuracies, and this is the proprietary technology used in N-RTK or Network RTK, a service, provided by companies such as Leica, Trimble etc. The N-RTK service has two methods of operation [15]. The Virtual Reference Station (VRS) method as adopted by agencies like Trimble is a unicast system where the GPS receiver contacts a central server, which in turn computes the corrections from the set of receiver stations in the vicinity of the receiver and gives an estimate of the receiver's location. The Master Auxiliary Concept (MAC) method allows for a broadcast system wherein a single master reference station amongst a cluster of reference stations in a cell, broadcasts the corrections. The rover in turn interpolates these corrections to estimate the corrections at its location. The MAC method also allows for a two-way mode where the reference station calculates the corrections for the rover as in the case of VRS. In our opinion, the question of whether one would want to adopt a unicast system or a broadcast system depends on the application. For a large-scale application like Intelligent Transportation Systems, it might be desirable to have a broadcast system and have all the intelligent processing done at the GPS receiver as compared to a central server. If every vehicle is required to know its location accurately, it is more efficient to broadcast the error measurements to all the vehicles in contrast to every vehicle contacting a centralized server to compute its location estimate since the error measurements would be common to all the vehicles in a particular region of interest.

HA-NDGPS is the technology that is being standardized by the federal DOT as the technology of choice for achieving high accuracy positioning for ITS applications. The federal DOT has commissioned a couple of pilot programs to improve on this technology to achieve cm level accuracies nationwide. The pilot sites are in Maryland and Pennsylvania and the research is being headed by the Turner Fairbanks Highway Research Center. The current and planned coverage areas are in the map below:

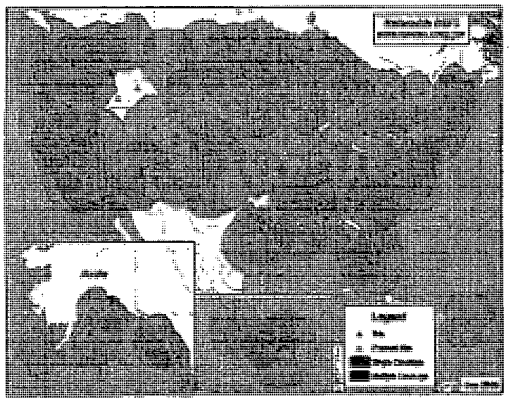


Figure 1: HA-NDGPS Coverage Area

Additionally, we have researched state run, cooperative and private run positioning and augmentation services. Most of these services are N-RTK corrections. Figure 2 shows the states with N-RTK deployments we have found as of December 2010.

Figure 2: N-RTK Deployments Reviewed [4]

The red states denote N-RTK deployments partnered with Trimble, while the blue states denote N-RTK deployments partnered with Leica. The green states partners were either unidentifiable or only explored, but never actually deployed an N-RTK network. Within this group of states the State run programs and Private/Public Cooperatives are as follows:

State DOTs	Public/Private Cooperatives
Utah	Texas
Ohio	Washington
Iowa	Midwest (Indiana)
Oregon	Alabama
California	
Michigan	
Minnesota	
Wisconsin	

Throughout these deployments there are many similarities in infrastructure. The first implementations were in the early 1990s and have continued through the 2000s. From an infrastructure standpoint the industry standard seems to place N-RTK base stations 60km to 70km apart. Most of the deployments have around 50 to 80 base stations. Some of the cooperative deployments continue to grow due to increasing membership, and in addition, some of the nascent state DOT's deployments also have expansion plans in place. All of the deployments offer centimeter level accuracy within their network [4].

The networks differ in their access rules. Currently all state DOT networks charge no fee for usage, except for Utah, which just changed policies and began charging $400 annually. The cooperative networks typically charge between several hundred and several thousand dollars annually. On top of this, users must purchase a receiver and applicable cellular plan for the data flow. Cellular plans typically range in the order of $100 while receivers range from several hundred to several thousand depending on capability.

These costs seem bearable by markets such as Agriculture, Surveying, and Construction services, due to their high use of these state-run and cooperative networks. Only one state, Minnesota, had implemented and deployed N-RTK for transportation purposes. They use the network for snowplows and inner city bus routes [16]. Three states were questioned for cost information: Iowa, Ohio and Washington. These systems range between $50K and $115K in expenditures per base station to perpetuity. These costs are discussed in further detail in a separate section. To gain further understanding of the availability of C-HALO services, we review private services offered by Omnistar and Leica [17, 18 & 19].

Leica has SmartNet, which is N-RTK coverage, in many states across the United States. Based on SmartNet's service agreement [20, 21], Leica offers 1-2 cm horizontal accuracy and 2-3 cm vertical accuracy under conditions of good satellite coverage, good geometry, and low multipath environments. However we have not been able

to locate, from Leica, the percentage of time those conditions are satisfied within their areas of coverage. Typically their coverage is provided through private investment, and partnerships with other Leica network deployments. The service agreement [20] explicitly mentions that Leica geosystems disclaims warranty to the accuracy of the data created by or passing through the SMARTNET Reference Station Network. Omnistar currently claims 99% availability of C-HALO services in the United States. This is offered using DGPS technology and entails an annual subscription service as well as investment in a GPS receiver. The subscription services range from $800 for the least accurate (sub-meter) to $2500 for the most accurate (centimeter) per receiver. The receivers generally cost around $5000 and are available from Trimble, Novatel, Raven, Topcon and others.

BENEFIT ASSESSMENT

Our approach is to determine a suite of ITS applications that require a high accuracy location service, find the benefits of these applications, and associate them to C-HALO. The ITS applications analyzed are those listed by the FHWA [22]. A comprehensive list of these applications appears in [4]. This list is analyzed for its location accuracy requirements and we filter down the application list to 8 groups of applications. If the applications require 1m or less accuracy, the applications and their benefits are analyzed, and associated to C-HALO.

Each application is explored independently to determine the efficacy rate, and the monetary benefit from reducing accidents (and in turn injuries and fatalities), Vehicle Miles Traveled (VMT), travel times, emissions, and the like depending on the application. This type of methodology is similar to those used in other CBA's completed by the USDOT and other international governmental agencies. The method we use takes into account the cash flow estimates of the benefits over a 22 year period, and discounts those into "today's" worth via a discount rate that is proposed for this type of analysis by the congressional budgetary office. The analysis is similar to that adopted by the Allen Group [5].

The final list of applications can be seen in the table below:

ITS Applications	Type	Included in Benefit Analysis
Curve Speed Warning	Safety	Y
Forward Collision/Braking Warning	Safety	Y
Emergency Electronic Brake Lights		
Cooperative Forward Collision Warning		
Merge/Lane Change Applications	Safety	Y
Highway Merge Assistant		
Lane Change Warning		
Blind Spot Warning		
Blind Merge Warning		
Left Turn Assistant	Safety	Y
Stop Sign Movement Assistant	Safety	Y
Highway/Rail Collision Warning	Safety	Y
Intersection Collision Warning	Safety	Y
Corridor Management	Mobility	Y
Intelligent Traffic Flow Control		
Free-Flow Tolling		

ASSUMPTIONS

Some overall assumptions have to be made to estimate the benefits. Overall assumptions cover predictions we make about the national economy into the next 20 years, and general assumptions on how the new technology would be adopted by the ITS sector. We later on make application-based assumptions to estimate the particular efficacy of each application.

Technology Adoption Rate – The shape of this curve determines how quickly the fleet will adopt new technology, in this case C-HALO. The s-curve used in this analysis is leveraged from a report, by the Allen Group [5], which analyzes the benefits of high accuracy location data in non-ITS industries. The general shape of the curve is in Figure 3.

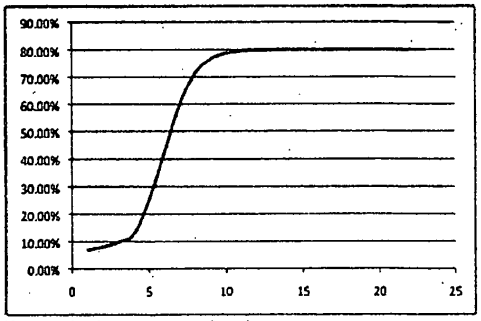


Figure 3: Technology adoption curve

This curve is applied over a project horizon of 22 years, 2008 – 2030. In calculating benefits, this adoption rate was typically used to determine the correct portion of benefits accumulated in a given year.

Discount Rate – This rate is used to discount future cash values to current day terms by taking into account inflation and a risk free rate of return, the higher the rate the more significant the discount to future cash values. For this analysis, a discount rate of 5 percent is used, and is taken from the Office of Budget and Management [23]. They also suggest using a range from 3 to 7 percent.

Value of Time – The value of time is used in quantifying reductions in delay into monetary benefits. Again, the Volpe study quotes two figures, one for local travel, $11.20, and the other for intercity travel $15.60. These figures are from the Office of the Secretary of Transportation [24]. In our analysis, we take both figures and average them since in our data we have both local as well as intercity travel. The resulting figure is $13.40.

Delay Growth – The delay growth is calculated using figures from the Traffic Congestion and Reliability Report prepared by Cambridge Systematics for the FHWA in 2005 [25]. Using a twenty-year historical data (hours of delay per traveler) and trend analysis, a growth rate of 6.5 percent is calculated.

SOURCES OF DATA

Accident Data – For the Safety applications, all accident data is culled from the GES database [26], which includes all types of accidents, not just accidents including fatalities. This database is then queried to ensure the appropriate accidents are being accounted for with regards to each individual application. Please see [4] for the querying methodology for each application class. We have also examined the FARS database [27], which includes fatal accidents.

Accident Growth Rate – The accident growth rate is used to project accident counts for years 2009 – 2030. The Volpe VII report projects accident rates based on VMT estimates and increased safety measures. These yearly accident rates are used to calculate the compound annual growth rate over the project horizon [24]. This rate is calculated to be -0.2 percent.

Fatality Worth – This value is used in determining the benefit of reducing the count of fatal accidents. The Office of Management and Budgets put forth a memorandum in 2008 that suggests to the DOT that $5.8 million be used for the value of a life. It also suggests using a range of $3.2 million to $8.4 million [28].

Injury Worth – These values are based on percentages of the fatality worth. Again there is a standard, and that is the Maximum Abbreviated Injury Scale. Typically there are 5 injury levels not counting a fatality [28]. In the FARS database only three levels of injuries are reported not counting fatalities. Therefore averages were taken first and second level and the third and fourth levels to determine the three percentages used in this analysis. The percentages used are in Table 1.

Table 1: Injury Worth Percentages

Injury Worth (% of Fatality Worth)	
Incapacitating	47.50%
Non-Incapacitating	5.80%
Possible/Light Injury	0.90%

SAFETY APPLICATIONS

As part of the safety analysis, seven applications are analyzed: Curve Speed Warning, Forward Collision Warning, Merge/Lane Change Warning, Left Turn Assistants, Stop Sign Movement Assistant, Highway/Rail Collision Warning, and Intersection Collision Warning. All of these applications are focused on reducing accidents, and in turn fatalities and other injuries. For all the applications below, the discounted yearly monetary benefit is calculated based on equation (1), where B is monetary benefits, n is the year, j is the application, and i is the injury level (fatal, serious, etc.).

Curve Speed Warning

Curve speed warnings would aid drivers in negotiating curves at appropriate speeds. This is aimed at reducing single and multi-vehicle accidents in curves due to unsafe speeds. To quantify the benefits of such a system we aimed to determine the number of accidents that could be reduced, then by using the assumptions laid out in previous sections, calculate a monetary benefit for reducing accidents.

To begin this process, the GES database was queried for specific accident data related to the application in question. For instance, all accidents that took place in curves, and were related to speed were included in this analysis. In 2008, there were 1048 fatalities, and ~29000 other injuries where this type of application may be applicable. To determine the benefit of this system an efficacy rate must be determined to see how much of a reduction from these figures can be expected.

Through another literature review, several reports were found discussing how effective curve speed warnings could be. The three reports and results are summarized briefly below:

- Field Evaluation of the Myrtle Creek Advanced Curve Warning System (Oregon DOT 2006) – Empirical analysis of I-5 implementation near Myrtle Beach, over 75 percent of people reduced speeds entering the curves with dynamic message signage.

The FHWA report [24] uses this value as a measure of efficacy of the curve speed warning applications when assessing the benefits of wireless communication to ITS.

- Rural ITS Toolbox (FHWA 2001) – Empirical study for trucks in Colorado. Speeds were reduced by 25 percent.
- An Evaluation of Dynamic Curve Warning Systems in the Sacramento River Canyon: Final Report (CA DOT 2000) - Empirical analysis of five locations on
- I-5 in California, over 70 percent of people reduced speeds entering the curves with dynamic message signage.

Using these sources as references, we chose to use 40% accident reduction as a mid-level efficacy rate. A low level would be 20% while a high efficacy level would be 70%. For a matrix of the efficacy rates please see [4].

Using the formula (1) and a low efficacy rate, preliminary benefits of ~$54 Billion were estimated.

Forward Collision Warning

Forward collision warnings alert a driver when a forward vehicle brakes hard (deceleration is above a predetermined threshold). This is very similar to Cooperative Forward Collision Warning which is used to preemptively avoid rear-end collisions with vehicles in front of the subject vehicle. In 2008, there were 241 fatalities, and ~109000 other injuries where this type of application may be applicable. To determine the benefit of this system an efficacy rate must be determined to see how much of a reduction from these figures can be expected.

Through another literature review, several reports were found discussing how effective forward collision warnings could be. The three reports and results are summarized briefly below:

- Evaluation of an Automotive Rear-End Collision Avoidance System (Volpe 2006) – A study that analyzed data from a field operation test and the results suggest that 10% of all rear-end collisions could be reduced.
- Integrated Vehicle Based Safety Systems: A Major ITS Initiative (FHWA 2005) – A study on IV systems that suggests these types of applications could reduce rear end, run off road, or lane change collisions by 48%.
- The Evaluation of Impact on Traffic Safety of Anti-Collision Assist Applications (Sala, Gianguido & Lorenzo Mussone, 1999) – A simulation study that suggests between 10% and 60% accident reduction could be attainable depending on the adoption rate of the technology. This is very interesting and one of the only studies that addresses changes in effectiveness due to technology adoption.

Using these sources as references, we chose to use 25% accident reduction as a mid-level efficacy rate. A low level would be 10% while a high efficacy level would be 50%. Using formula (1) and the low efficacy rate, preliminary benefits of ~$28 Billion were estimated.

Merge/Lane Change Warning

These warnings would alert a vehicle on highway on-ramps if another vehicle occupies its merging space (or in its blind spot). This is similar to Blind Merge Warning where warnings are used for vehicles attempting to merge with limited sight distance, and another vehicle is predicted to occupy the merging space. In addition, this system could warn the subject driver if a lane change is likely to cause a collision, triggered by turn signal activation. In 2008, there were 13 fatalities, and ~3500 other injuries where this type of application may be applicable. To determine the benefit of this system an efficacy rate must be determined to see how much of a reduction from these figures can be expected.

Through another literature review, several reports were found discussing how effective merge or lane change warnings could be. The four reports and results are summarized briefly below:

- Integrated Vehicle Based Safety Systems: A Major ITS Initiative (FHWA 2005) – A study on IV systems that suggests these types of applications could reduce rear end, run off road, or lane change collisions by 48%.
- Freightliner to Offer Collision Warning on New Truck Line (Inside ITS 1995) – Empirical study of Transport Besner Trucking Co, which reduced its at-fault accidents by 34%.
- Dutch Field Operational Test Experience with "The Assisted Driver" (Alkim, Boostma, and Hoogendoorn 2007) – Empirical study of 20 vehicles in the Netherlands equipped with warning systems that were driven for five months. It found that unintentional lane changes were reduced by 35% on arterials, while it was reduced by 30% on highways.
- Run-Off Road Collision Avoidance Using IVHS Countermeasures: Final Report (NHTSA, 1999) – A simulation study that looked at lane departure warnings. Suggests passenger vehicle lane departures

$$B = (EffRate_j * Adopt_n * \sum (InjuryCount_{i,n} * Injury_i\% * FatalityWorth))/DiscountFactor_n \quad (1)$$

would decrease by 10%, while heavy trucks would decrease by 30%.

Using these sources as references, we chose to use 35% accident reduction as a mid-level efficacy rate. A low level would be 15% while a high efficacy level would be 60%. Using formula (1) and the low efficacy rate, preliminary benefits of ~$2.1 Billion were estimated.

Intersection Collision Warning

Intersection Collision Warning applications provide warnings to drivers that a collision is likely at the upcoming intersection either due to their own speed or inattention, or that of another driver. In 2008, there were 88 fatalities, and ~37000 other injuries where this type of application may be applicable. To determine the benefit of this system an efficacy rate must be determined to see how much of a reduction from these figures can be expected.

Through another literature review, several reports were found discussing how effective intersection collision warnings could be. The two reports and results are summarized briefly below:

- Field & Driving Simulator Validations of System for Warning Potential Victims of Red-Light Violators (Inman, Vaughan TRB 2006) – A Field and Simulation study that tested participants in a driving simulator and on a closed track. In the simulator, 90% stopped or avoided the collision, while on the track, 64% stopped or avoided the collision.
- Intersection Collision Avoidance Study (FHWA Office of Safety 2003) – An in depth analysis of literature and operational concepts of specific ICAS systems, and they state that 100% reduction in accidents is not unrealistic, however a more conservative estimate would be a 50% reduction in accidents.

Using these sources as references, we chose to use 50% accident reduction as a mid-level efficacy rate. A low level would be 25% while a high efficacy level would be 75%. Using formula (1) and the low efficacy rate, preliminary benefits of ~$33 Billion were estimated.

Left Turn Assistant

Left Turn Assistants provide drivers information about oncoming traffic when trying to take a left-hand turn at an unprotected intersection. In 2008, there were 26 fatalities, and ~24000 other injuries where this type of application may be applicable. To determine the benefit of this system an efficacy rate must be determined to see how much of a reduction from these figures can be expected.

Since the application is very similar to that of intersection collision warnings, the literature used to determine an efficacy rate for that application were leveraged for this application as well. Using these sources as references, we chose to use 50% accident reduction as a mid-level efficacy rate. A low level would be 25% while a high efficacy level would be 75%. Using formula (1) and the low efficacy rate, preliminary benefits of ~$21 Billion were estimated.

Stop Sign Movement Assistant

Stop Sign Movement Assistants alert vehicles about to cross an intersection, after stopping, of cross traffic. In 2008, there were 110 fatalities, and ~10000 other injuries where this type of application may be applicable. To determine the benefit of this system an efficacy rate must be determined to see how much of a reduction from these figures can be expected. Since the application is very similar to that of intersection collision warnings, the literature used to determine an efficacy rate for that application were leveraged for this application as well.

Using these sources as references, we chose to use 50% accident reduction as a mid-level efficacy rate. A low level would be 25% while a high efficacy level would be 75%. Using formula (1) and the low efficacy rate, preliminary benefits of ~$10 Billion were estimated.

Highway/Rail Collision Warning

Highway/Rail Collision warnings provide alerts to reduce the likelihood of a collision between vehicles and trains on intersecting paths. In 2008, there were 0 fatalities, and ~0 other injuries where this type of application may be applicable. To determine the benefit of this system an efficacy rate must be determined to see how much of a reduction from these figures can be expected. Through another literature review, a report was found discussing how effective Highway/Rail Crossing Warnings could be. The report and results are summarized briefly below:

- Second Train Coming Warning Sign Demonstration Projects (TCRP Research Results Digest, 2002) – A demonstration study of two sites, one in Baltimore and the other in LA, where warnings were placed for approaching trains. 26% of drivers reduced the most risky behavior.

Using these sources as references, we chose to use 25% accident reduction as a mid-level efficacy rate. A low level would be 10% while a high efficacy level would be

50%. Using this formula and the low efficacy rate, preliminary benefits of ~$0 Billion were estimated.

MOBILITY APPLICATIONS

As part of the mobility analysis, two applications are analyzed: Intelligent traffic flow control and free flow tolling. Both of these applications are focused on reducing delay and require lane-level positioning accuracy to operate and therefore would benefit from a C-HALO nationwide deployment.

Intelligent Traffic Flow Controls (ITFC)

ITFC uses real-time data to adjust signal phases to an optimal level. These applications could also include Green Light Optimal Speed Advisory, which would provide the subject vehicle with the optimal speed given signal phase timing at upcoming intersections. To quantify the benefits of such a system two additional pieces of information are needed to complete the calculation. The first is to determine how much delay is currently realized at signalized intersections. This was done through a literature review, and Temporary Losses of Highway Capacity and Impacts on Performance (Phase 2), written by Oak Ridge National Laboratory for the Department of Energy, discusses sub-optimal signal timing specifically. Through surveying and significant quantitative modeling they determine that there is, as of 1999, ~295 million hours of delay at signalized intersections.

Lastly, the efficacy of these new systems needs to be estimated. Through another literature review, several reports were found discussing how much more optimal signal timing assisted in reducing delay. The three reports and results are summarized briefly below:

- Preliminary Evaluation Study of Adaptive Traffic Control System (LA DOT 2001) – Empirical study in LA with 375 intersections, reduced delay by ~21%
- Realizing Benefits of Adaptive Signal Control at an Isolated Intersection (Park and Change 2002) – A simulation study on a hypothetical intersection of two one-way streets. Reductions in delay were between 18-20%
- ITS Benefits: The Case for Traffic Signal Control Systems (Skabardonis 2001) – Empirical study of multiple California implemented systems, reductions of delay close to 25%.

Using these sources as references, we chose to use 15% delay reduction as a conservative efficacy rate. Using formula (1), preliminary benefits of ~$10 Billion were estimated.

Free Flow Tolling

Toll collection without toll plazas reducing stop and go traffic surrounding current toll plazas, also beneficial, but not included in this analysis is the fact that in tolling situations, costs are actually saved by not having to build facilities. In this exercise we only look at reduced delay. To calculate the delay reduced by free tolling systems, some metrics need to be deciphered. Average delay at a toll facility, the total revenue of all tolling facilities, and the average toll for toll roads in the U.S are three metrics needed to calculate total delay due to toll facilities. Again, this was done through a literature review, and Temporary Losses of Highway Capacity and Impacts on Performance (Phase 2), written by Oak Ridge National Laboratory for the Department of Energy, discusses average toll delay. Through thorough quantitative analysis, they determine the average tolling delay to be 11.9 sec per vehicle.

With this figure, only the number of vehicles would be necessary to determine overall delay. To determine the number of vehicles using toll facilities, total tolling revenues and average toll were sought. In the Highway Statistics 2007 published by the FHWA, the total revenues of toll facilities was $7.7 billion, while in the Toll Facilities in the U.S. August 2009, the average toll is calculated to be $3.89 (25). Using these two figures, an annual vehicle count of ~2 billion was determined. This was grown on a year-to-year basis at a rate of 1.65% (26).

Lastly, the efficacy of these new systems needs to be estimated. Through another literature review, several reports were found discussing how much free tolling systems reducing delay. The two reports and results are summarized briefly below:

- Evaluation of Impacts from Deployment of an Open Road Tolling Concept for a Mainline Toll Plaza (Klodzinski 2007) – Twenty-month empirical study done around UCF which reduced delays by approximately 50 percent.
- Operational and Traffic Benefits of E-Zpass to the New Jersey Turnpike (NJ Turnpike Authority 2001) – EZ-pass empirical study that showed 85 percent reductions in delay.

Using these sources as references, we chose to use 70% delay reduction as a conservative efficacy rate. Using formula (1), preliminary benefits of ~$0.6 Billion were estimated.

Efficacy Literature Caveat

The ITS application benefit numbers are from the RITA ITS Benefits database online. Since ITS funding is part of RITA's budget, we have found and checked benefit

numbers from some of these applications in documents from m the GAO (27), RAND (28), and CBO (29). These do not challenge the assumptions made and published by RITA with respect to the analyzed applications. The RITA database is the most comprehensive.

Summary of Benefits

After completing all these individual analyses, the sum of these benefits ranges from $160 billion to $320 billion. This range depends on whether one uses the low-level safety application efficacy rates or the mid-level efficacy rates. This translates into 1.1 to 2.2 percent of GDP. The safety benefits in the analysis dominate, making up over 90 percent of the total benefits calculated.

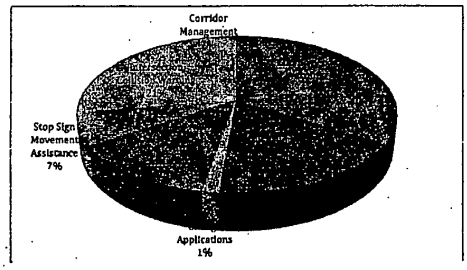


Figure 4: Benefits by Category

COST ASSESSMENT IN GOOD GPS AREAS

Here we quantify the new infrastructure investment required to realize a C-HALO service in areas with good GPS coverage based on N-RTK technology. This cost does not include the wireless communication technology between vehicles, but just the cost of deploying the infrastructure to provide the service. For the purposes of this analysis we explored the cost of implementing N-RTK infrastructure. This of course, is an upper bound on the cost estimate of the infrastructure since in reality some areas of the U.S. are already covered by N-RTK service, while others areas may not need it (i.e. some areas may already have C-HALO capability without N-RTK).

The present N-RTK system consists of a set of references stations and servers installed and maintained by companies/governmental agencies offering the service. Customers use the service by paying a subscription fee. The NRTK servers provide the rovers with the RTCM corrections as and when requested by the rover. A typical N-RTK system as implemented by companies like Trimble and adopted by the present DoT's, consists of the following components [29]:

1. N-RTK base stations with geodetic and communication capabilities
2. Server(s) that can handle incoming NRTK requests and RTK corrections, process the data and transmit the correction data to the rovers.
3. Communication links between reference stations and server(s) and the rovers and the server(s).

The capital costs involved in setting up such a system would include:

a) Hardware - NRTK reference stations (*) and the servers.
b) Software on the servers and reference stations. This should also have the ability to handle secure communication.
c) Design (hardware, site selection etc), testing and installation of the reference stations (*).
d) Predicted hardware and software upgrades (*).

Variable costs include

a) Hardware and software maintenance costs for the server and reference stations (*).
b) Rent/value of facility for the reference stations (*) and servers.
c) Link costs for the communication from reference stations to server (*) and from server to rovers.
d) Power supply to reference stations (*) and servers.
e) Customer support.

The cost estimates in Table 2 are for the installation and maintenance of a single base station and include the costs marked (*) in the NRTK system components.

N-RTK Base Station Cost Estimation

To begin estimating the infrastructure cost of deploying N-RTK infrastructure, discussions, via email and phone, were held with employees of three current N-RTK deployments, 2 state DOT's (Iowa and Ohio) and one Cooperative (Washington). During these emails and conversations the costs associated with infrastructure cost requirements, as well as maintenance and operating costs were focused on. We also obtained concrete documents on invoices and cost reports for the hardware, servers, services etc. from these DOT's [4]. These costs are summed and determined over the 22-year horizon using a 5% discount rate. The calculations are shown in Table 2.

	Cost Estimate (Per Base Station)
Hardware	**$20,000**
Software	$400
R&D	$300
IT	$120
Misc Hardware	$120
Servers	$90
Support/Maint	$1,000
Comm/Power	$1,000
Rent	$24,000
Other	$0
TOTAL per Tower	**$47,030**
PV of Horizon Cost	**$413,402**

Table 2: N-RTK Cost Estimation (No Other (Contingency) Costs)

This is the representative cost given average levels of all the above costs. There are low and high estimates for each cost category, including the useful life of the hardware, which ranges from 7 to 15 years. This useful life changes the 22-year horizon cost of the hardware. The range of infrastructure costs is from $220K to $615K per base station for the life of the system. Using a range of annual contingency expenses from $25K to $70K the range of infrastructure costs increases to $570K to $1.6M per base station for the life of the system. If one were to provide N-RTK coverage over the entire US land mass for the horizon of this project, approximately 2,730 base stations would be needed. Using this figure, nationwide N-RTK coverage would cost between $1.6 billion to $4.4 billion. This may be compared to benefits ranging between $160 and $300 billion from the Intelligent Transportation Systems Sector alone.

CONCLUSIONS

In this report we focused on estimating the benefits of a high-accuracy location service to the transportation sector and the costs of rolling out such an infrastructure. While accomplishing many things during this process, we realized that there are still many areas of research that could improve the analysis and enhance scope to incorporate more levels of detail. Areas of further explorations are briefly discussed below:

- *Communication Technology Research:*
  Further research needs to be done on how the actual augmentation services will be communicated to the vehicles and between vehicles. This analysis has not been included in this report, but is integral in realizing the benefits of the new ITS applications.

- *Benefit Refinement:*
  Ultimately, the benefits calculations could be expanded to include environmental benefits.

- *Technology Assessment:*
  To achieve a more thorough understanding of where N-RTK stands in terms of cost effectiveness a more complete technology assessment needs to be completed. As part of this, the cost of infrastructure for each technological alternative needs to be completed, as well as analyzing the capabilities of each technology. Once this analysis is complete, the technologies can be compared and a prudent decision going forward could be made.

- *Other Economic Stimulus:*
  Analysis could be completed on what type of economic development may be induced due to these applications, specifically the mobility applications since the main component of the benefits is saved time. Typically if users are saving time, they are using that time to create benefits in another industry or realm. These effects need to be explored more fully to get a better estimate of the full benefits of implementing C-HALO services.

ACKNOWLEDGMENTS

The authors gratefully acknowledge a gift from ATLIS Wireless, LLC that has, in part, made this work possible. The content of this paper is solely determined by its authors.

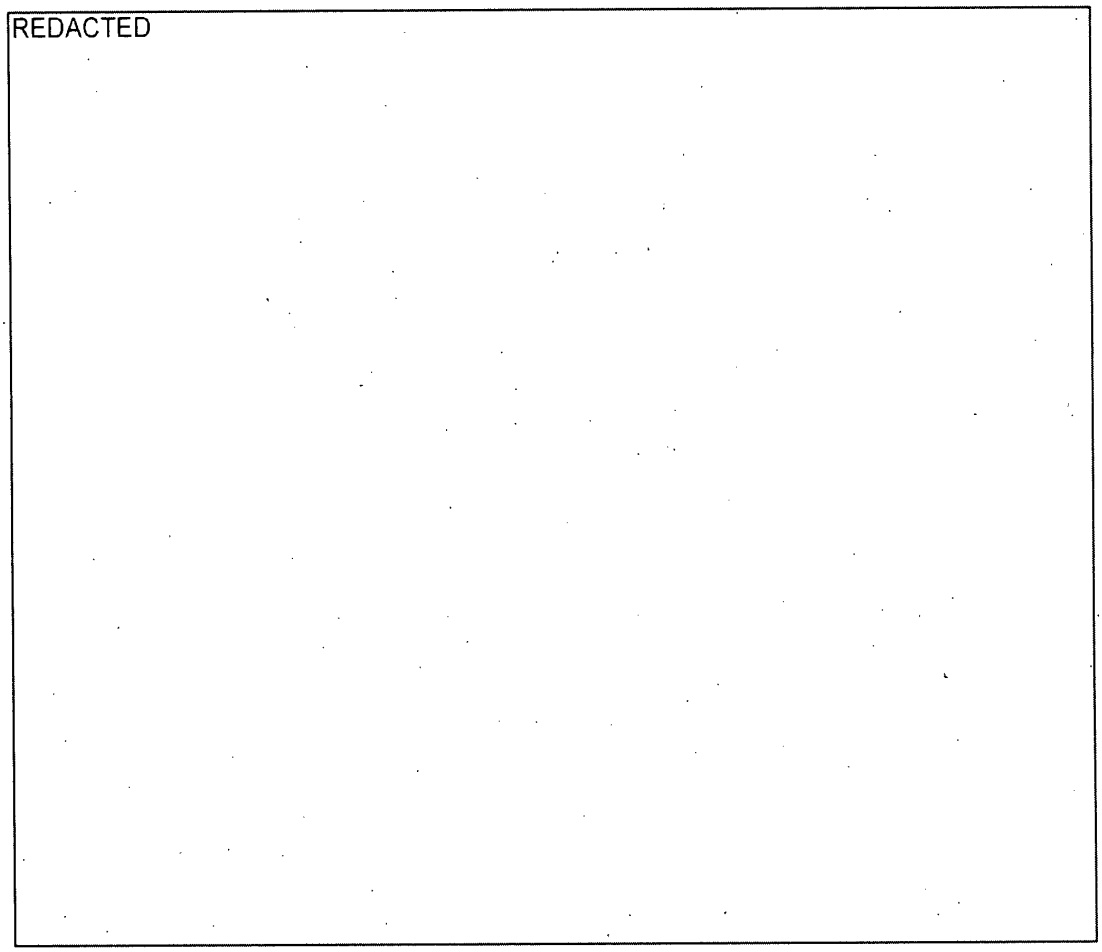
REFERENCES

[1] Chris Rizos, "Network RTK research and implementation: A geodetic perspective", Journal of Global Positioning Systems, 2002.
[2] Beser, J. and Parkinson, B.W, "The application of NAVSTAR differential GPS in the civilian community", Navigation, 1982.
[3] Gakstatter, Eric and Lorimer, Robert. GNSS Market Research and Analysis. Position One Consulting Pty Ltd. September 2008.
[4] Adam Goodliss, Christian Manasseh, Venkatesan Ekambaram, Raja Sengupta, Adib Kanafani, Kannan Ramchandran, "High Accuracy Location Based Services Cost Benefit Study", report, UCB-ITS-RR-2011-1
[5] Economic Benefits of High Resolution Positioning Services. The Allen Consulting Group Pty Ltd. Nov 2008.
[6] Leveson, Irving. Socio-Economic Benefits Study: Scoping the Value of CORS and GRAV-D. Leveson Consulting. January 2009.
[7] Alcantarilla, I., Porras, D., Tajdine, A., Zarraoa, N., Lévy, J.C., "The Benefits of Multi-constellation GNSS Augmentations," Proceedings of the 19th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS 2006), Fort Worth, TX, September 2006, pp. 930-938.

[8] M. Zabic and O.A. Nielsen, An analysis of stand-alone GPS quality and simulated GNSS quality for Road Pricing.
[9] Swann, J., Chatre, E., Ludwig, D., "Galileo: Benefits for Location-Based Services," Proceedings of the 16th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GPS/GNSS 2003), Portland, OR, September 2003, pp. 1603-1612.
[10] Vollath, Ulrich, Patra, Richard, Chen, Xiaoming, Landau, Herbert, Allison, Timo, "GALILEO/Modernized GPS: A New Challenge to Network RTK," Proceedings of the 17th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS 2004), Long Beach, CA, September 2004, pp. 2855-2863.
[11] Arthur, Daniel, Jenkins, Bryan, von Tunzelmann, G. Nick, Styles, Jon, "The Macroeconomic Impacts of Galileo," Proceedings of the 18th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS 2005), Long Beach, CA, September 2005, pp. 381-389.
[12] Brennan, Shawn M., Van Dyke, Karen, "National PNT Architecture - Interim Results," Proceedings of the 63rd Annual Meeting of The Institute of Navigation, Cambridge, MA, April 2007, pp. 614-623.
[13]http://www.fhwa.dot.gov/publications/research/operations/02110/index.cfm
[14]http://www.fhwa.dot.gov/publications/research/operations/its/05034/05034.pdf
[15] Volker Janssen, New Ways to Network RTK: How do VRS and MAC measure up? http://eprints.utas.edu.au/9327/
[16] Mn/DOT CORS GPS Network. Minnesota Department of Transportation. http://www.dot.state.mn.us/surveying/CORS/CORS.html. Accessed December 17, 2010.
[17] Email from Steve Milligan, to Adam Goodliss. Re: RTK/CORS Network Cost Information - UC Berkeley Research. Received October 24, 2010.
[18] Email from Dave Beiter, to Adam Goodliss. Re: RTK/CORS Network Cost Information - UC Berkeley Research. Received October 21, 2010.
[19] Phone Interview with Gavin Schrock. Re: RTK/CORS Network Cost Information - UC Berkeley Research. Conducted October 25, 2010.
[20]http://smartnet.leica-geosystems.us/9SmartNetSubAgree.html
[21]http://smartnet.leica-geosystems.us/2eFAQ.html#whatisthertkaccuracy.
[22] The CAMP Vehicle Safety Communications Consortium. Identify Intelligent Vehicle Safety Applications Enabled by DSRC. March 2005.
[23] Jim Nussle, "Memorandum for the Heads of Departments and Services", Office of Management and Budget. December 12, 2008.
[24] Economic and Industry Analysis Division, John A. Volpe National Transportation Systems Center, United States Department of Transportation. "Vehicle-Infrastructure Integration Initiative: Benefit-Cost Analysis", Version 2.3. May 8, 2008.
[25] Cambridge Systematics. "Traffic Congestions and Reliability: Trends and Advanced Strategies for Congestion Mitigation." September 2005.
[26] General Estimates System Database FTP Site. ftp://ftp.nhtsa.dot.gov/GES/. Accessed Dec 17, 2010.
[27] The Fatality Analysis Reporting System. http://www-fars.nhtsa.dot.gov/QueryTool/QuerySection/SelectYear.aspx. Accessed August 23, 2010.
[28] Revised Departmental Guidance: Treatment of the Value of Preventing Fatalities and Injuries in Economic Analyses. Office of Management and Budget. 2008.
[29]http://www.fig.net/pub/athens/papers/ts11/TS11_5_Bray_Greenway.pdf
[30] Toll Facilities in the United States. Office of Highway Policy Information. August 2009. http://www.fhwa.dot.gov/ohim/tollpage.htm. Accessed August 23, 2010.
[31] Traffic Volume Trends. Federal Highway Administration. http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm. March 2010 and 2009. Accessed August 23, 2010

DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 4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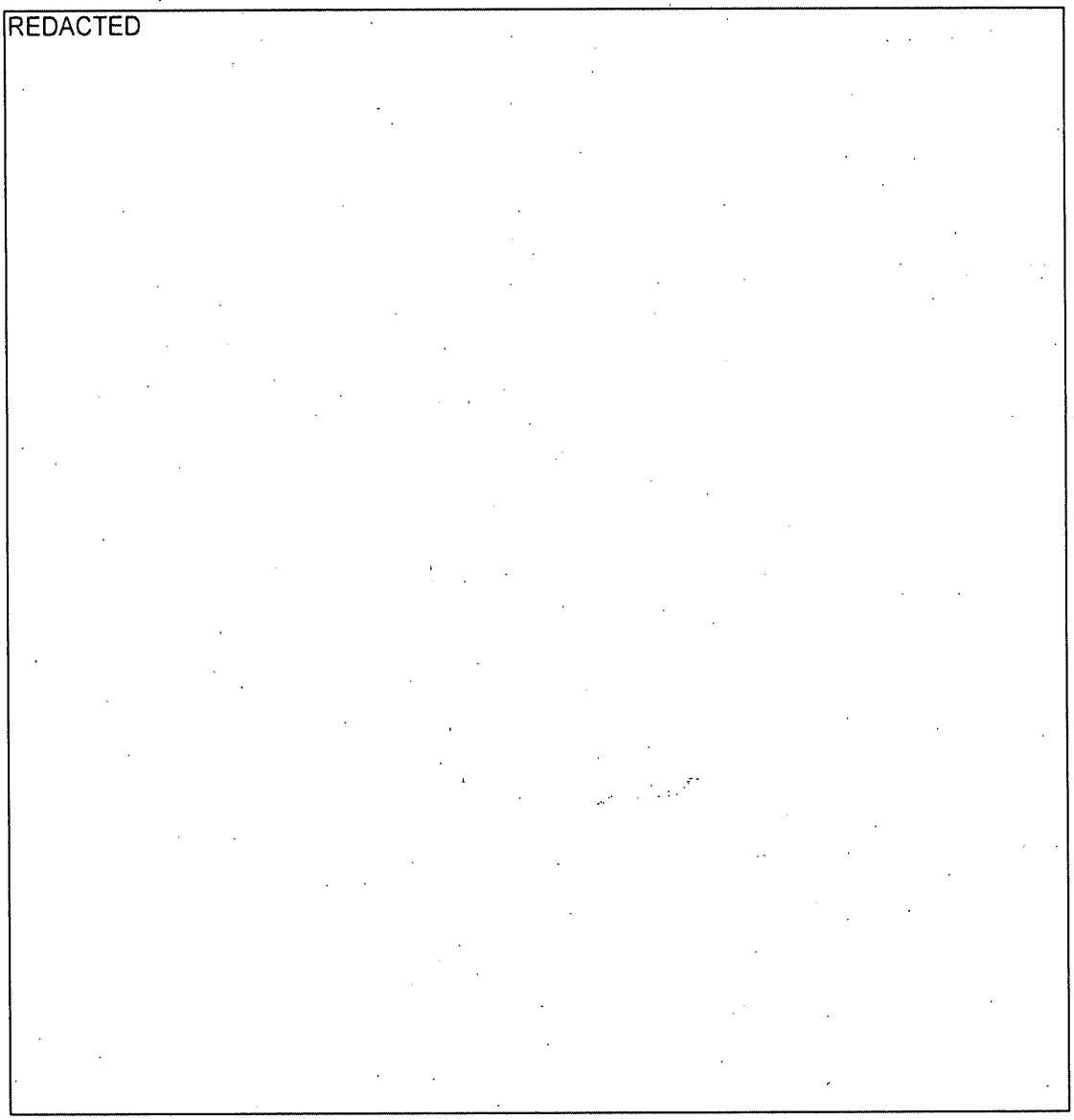
DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 5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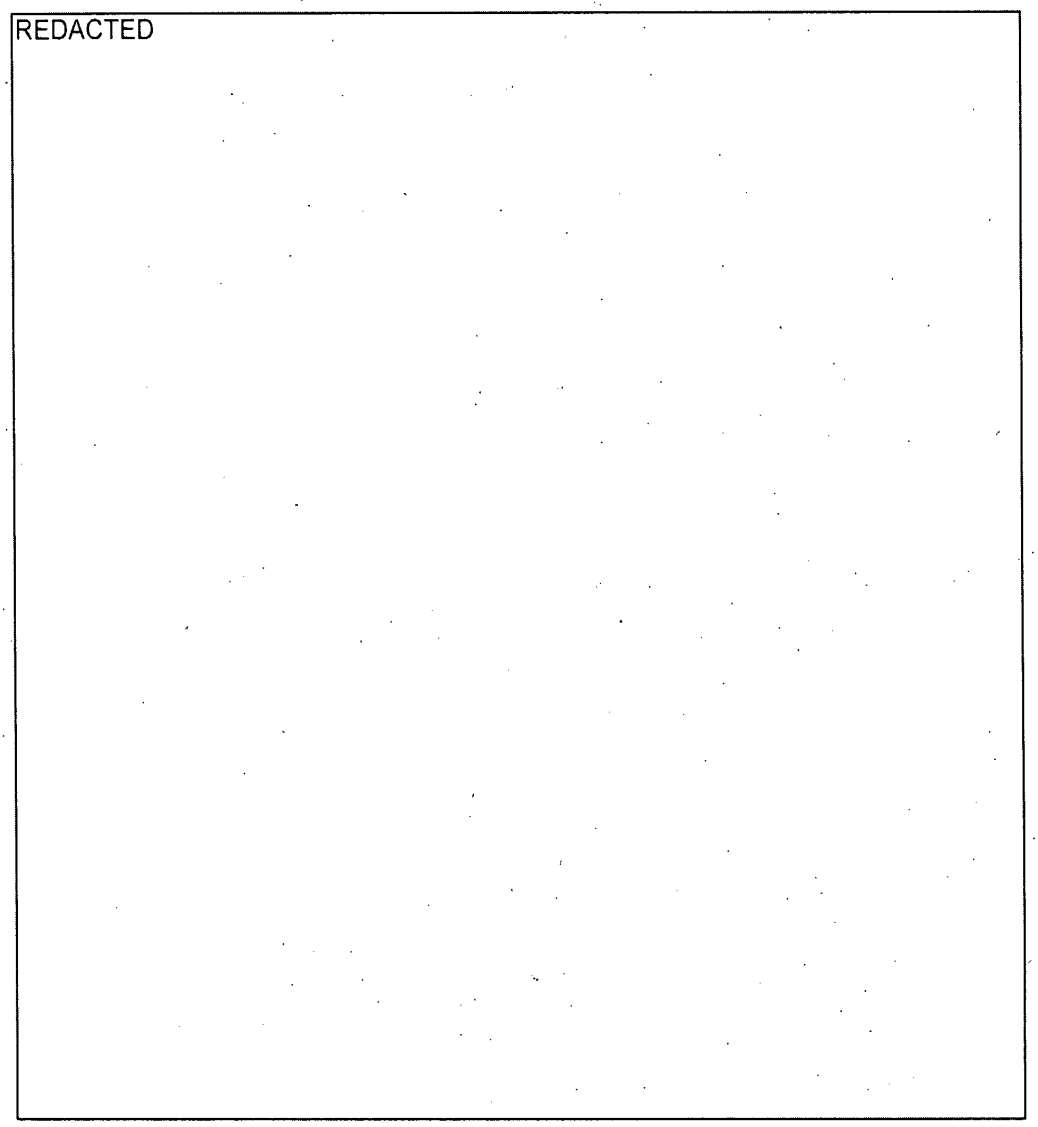
DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 6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DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 7

Norris, Todd

From: David DeGroot <DDeGroot@sheppardmullin.com>
Sent: Monday, August 15, 2016 6:22 PM
To: Downs, Andrew; Norris, Todd; James Robinson; Paul Kirsch; Richard Osman
Subject: Leong v. Havens - LMS status

Dear Counsel,

I write with an update regarding the Skybridge LMS licenses.

First, the Receiver does intend to request an extension of the construction deadline from the FCC. If you have any suggestions as to what should be included in the extension request, please provide those suggestions by August 22.

Second, given the negative feedback received after the Receiver provided a term sheet for selling the Skybridge LMS licenses to PCS Partners, the Receiver does not plan to proceed with that transaction. The Receiver's broker is continuing to explore the market for transactions involving the estate's LMS holdings.

Please advise with your input on the extension request at your earliest opportunity, along with any other questions you may have.

Thanks,
David

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DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 8

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
WILLIAM M. HOLLAND	)	
	)	
Conditional, Limited Request for Waivers	)	
	)	
Applications for Involuntary Assignment	)	FCC File Nos. 0006361933, 0006361947, and 0006361960
	)	
Applications for Renewal	)	FCC File Nos. 0006953371, 0006953372, 00069533374, 0006953375, 0006953376, 0006953377, 0006953378, 0006953379, 0006953380, 0006953381, and 0006953382
	)	

ORDER AND ORDER ON RECONSIDERATION

Adopted: April 28, 2016 **Released: April 29, 2016**

By the Deputy Chief, Mobility Division, and Deputy Chief, Broadband Division, Wireless Telecommunications Bureau:

I. INTRODUCTION

1. In this *Order and Order on Reconsideration*, we address the request of William M. Holland (Holland), the court-appointed receiver of Part 90 and Part 101 licenses formerly held by Pappammal Kurian (Kurian) or entities under her control, for a waiver of the Commission's construction and operation requirements regarding those licenses, and for reinstatement of certain expired or cancelled former Kurian licenses and a waiver of the Commission's construction and operation requirements regarding those expired or cancelled licenses.[1] We also address two petitions filed by Mobile Relay Associates (MRA) for partial reconsideration of the grant of the applications assigning licenses from Kurian to Holland,[2] and to deny Holland's applications to renew some of those licenses.[3] For the reasons stated below, we grant the MRA petition for reconsideration, dismiss as moot the MRA petition to deny, and grant in part the Holland waiver request.

[1] Conditional, Limited Request of William M. Holland for Waivers (filed Mar. 12, 2015) (Waiver Request). Mobile Relay Associates filed an opposition. Partial Opposition of MRA to Request for Waiver (filed Mar. 26, 2016) (MRA Waiver Opposition).

[2] Petition of MRA for Partial Reconsideration (filed Oct. 7, 2014) (MRA PFR). Holland filed an opposition, as did Environmentel LLC (Environmentel) and Warren Havens (collectively Havens Entities). Opposition of Havens Entities to Partial Petition for Reconsideration (filed Nov. 4, 2014); Opposition of Holland to Partial Petition for Reconsideration (filed Nov. 4, 2014) (Holland PFR Opposition). MRA filed a reply. Reply of MRA to Oppositions to Petition for Partial Reconsideration (filed Nov. 20, 2014).

[3] Petition of MRA to Dismiss or Deny (filed Oct. 23, 2015) (MRA PTD). Havens Entities and Holland filed oppositions. Opposition of Havens Entities to Petition to Dismiss or Deny (filed Nov. 5, 2015); Opposition of Holland to Petition to Deny (filed Nov. 5, 2015). MRA filed a reply. Reply of MRA to Oppositions to Petition to Dismiss or Deny (filed Nov. 17, 2015).

II. BACKGROUND

2. On August 31, 2011, the District Court of Clark County, Nevada entered judgment in favor of AMTS Consortium, LLC, against Kurian for over six million dollars.[4] Between that date and September 2012, Kurian filed an application to cancel one Commission license,[5] and nine other Commission licenses[6] expired without being renewed. In addition, the Mobility Division of the Wireless Telecommunications Bureau (Bureau) concluded that another license had automatically cancelled during this period on the basis of the permanent discontinuance of service,[7] *i.e.*, the station had not operated for one year or more.[8]

3. On October 16, 2012, the court issued a temporary restraining order (TRO),[9] which was later reduced to a preliminary injunction,[10] prohibiting Kurian from transferring or otherwise disposing of any assets, including Commission licenses. Between that date and the end of 2013, 29 more Kurian licenses expired.[11]

4. On January 29, 2014, the court appointed Holland as receiver to liquidate Kurian's licenses and distribute the proceeds to satisfy the judgment.[12] Specifically, the receivership order authorized Holland to seek Commission approval to take control of 116 specified licenses of Kurian or entities she controlled, and sell them. It also directed Kurian to turn over all records relating to the licenses within five business days, and not to interfere with Holland's control of the licenses, including his seeking needed approvals from the Commission. Another Kurian license expired in March 2014.[13]

5. On May 7, 2014, a day after being found in contempt of court for refusing to cooperate with the receiver,[14] Kurian executed powers of attorney granting Holland authority to act with respect to

[4] *See* Exhibit No. 1 (Judgment Against Pappammal Kurian, Case No. A-50938 (Dist. Ct., Clark County, Nev. Aug. 31, 2011) to Waiver Request, Exhibit 2 (Declaration of David Mincin) (Mincin Declaration). AMTS Consortium, LLC is now known as Environmentel.

[5] Station WPIQ777.

[6] Stations WPVA705, WPVC873, WPVI846, WPKV330, WPKW756, WPUZ885, WPVK903, WPVY998, and WPWA371.

[7] Station WQAQ340. *See Pappammal Kurian and Thomas Kurian*, Order on Reconsideration, 28 FCC Rcd 11025, 11027, para. 7 (WTB MD 2013) (*2013 Kurian Order*), *aff'd*, Order on Further Reconsideration, 29 FCC Rcd 5384 (WTB MD 2014).

[8] 47 C.F.R. § 90.157(a).

[9] *See* Exhibit No. 4 (Order Granting Temporary Restraining Order and Order to Show Cause Why a Preliminary Injunction Should Not Be Issued, Case No. A-12-669776-C (Dist. Ct., Clark County, Nev. Oct. 16, 2012)) to Mincin Declaration.

[10] *See* Exhibit No. 5 (Order Granting Temporary Restraining Order and Order to Show Cause Why a Preliminary Injunction Should Not Be Issued, Case No. A-12-669776-C (Dist. Ct., Clark County, Nev. Dec. 6, 2012)) to Mincin Declaration.

[11] Stations WPKW294, WPMG886, WPWE654, WPWL311, WPWP553, WPWZ654, WPWZ933, WPXC618, WPXC944, WPXH849, WPXJ243, WPXM684, WPXZ830, WPYD946, WPYE914, WPYE970, WPYF636, WPYI215, WPYI298, WPYI941, WPYM965, WPMP534, WPWS741, WPWZ689, WPXG546, WPXH319, WPXK760, WPXM412, and WPYQ412.

[12] *See* Waiver Request, Exhibit 1 (Order Granting Plaintiff's Motion to Appoint William Holland as Receiver, Case No. A-12-669776-C, at 2 (Dist. Ct., Clark County, Nev. Jan. 30, 2014)).

[13] Station WPMX234.

[14] *See* Exhibit 1 (Order Holding Pappammal Kurian in Contempt of Court, Case No. A-12-669776 (Dist. Ct., Clark County, Nev. May 6, 2014)) to Petition of Warren Havens, *et al* for Reconsideration, FCC File No. 0005264554.

the licenses.[15] In June 2014, another five Kurian licenses expired.[16]

6. On July 10, 2014, Holland filed applications for involuntary assignment to himself of the 69 licenses listed in the receivership order that had not expired or been cancelled.[17] The applications stated that Holland had been unable to verify the construction and operational status of the stations because Kurian had not turned over the relevant records.[18] The applications were accepted on September 10, 2014. On October 7, 2014, MRA filed a petition for partial reconsideration, arguing that 31 of the licenses had automatically terminated because they were never constructed or placed in operation, or had been out of operation for at least one year before the assignment applications were filed.[19]

7. On March 12, 2015, Holland requested reinstatement of all of the licenses that were cancelled and a waiver to permit late renewal of the licenses that had expired, and also requested a waiver of the Commission's construction and operation requirements to allow him 18 months to arrange sale of the licenses and an additional year for the assignees to bring the stations into operation.[20] He explains that this reinstatement and waiver will allow him to liquidate the licenses as contemplated by the receivership order, and argues that relief is warranted in light of Kurian's failure to abide by the court's orders.[21] He requests relief only with respect to as many licenses as need be sold in order to satisfy the judgment and pay the costs of the receivership; the waiver would not continue to apply to any remaining licenses.[22] MRA opposes the request with respect to the licenses specified in its petition for partial reconsideration of the assignment applications, and with respect to 13 of the cancelled or expired licenses.[23]

8. Holland has also filed renewal applications for a number of the 69 assigned licenses. On October 23, 2015, MRA filed a petition to dismiss or deny 11 of those renewal applications pertaining to licenses specified in MRA's petition for partial reconsideration of the assignment applications.[24]

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[15] *See* Exhibit 2 to Description of Assignment, FCC File Nos. 0006361933, 0006361947, 0006361960, 0006361965.

[16] Stations WQAH890, WQAJ377, WQAJ503, WQAJ984, and WQAJ986.

[17] *See* FCC File Nos. 0006361933, 0006361947, 0006361960, 0006361965 (filed July 10, 2014).

[18] *See* Statement Regarding Construction Status, FCC File Nos. 0006361933, 0006361947, 0006361960, 0006361965.

[19] Stations WNXG425, WPOZ668, WPRH562, WPRH760, WPRJ317, WPRJ618, WPRJ714, WPRJ815, WPRK215, WPRK286, WPRK711, WPRK946, WPRL297, WPRM344, WPSR462, WPSR875, WPTF275, WPTF276, WPTN279, WPTR503, WPTY595, WPUA346, WPUA453, WPUB270, WPUD601, WPUD821, WPUH708, WPUR914, WPXH935, WQUE734, and WQGU967. *See* MRA PTD at Appendix A. MRA does not seek reconsideration with respect to FCC File No. 0006361965, which did not assign any of these licenses. *See* MRA PFR at 1 n.1.

[20] *See* Waiver Request at 5-6.

[21] *Id.* at 6-9.

[22] *Id.* at 5.

[23] *See* MRA Waiver Opposition at 1-2.

[24] Stations WPRH562, WPRJ317, WPRJ618, WPRJ714, WPRJ815, WPRK215, WPRK286, WPRK711, WPRK946, WPRL297, and WPRM344. (It appears, from its reference to "twelve Discontinued Licenses," *see* MRA PTD at 3, that MRA also intended to oppose Holland's application to renew the license for Station WPRH760 (FCC File No. 0006953368), but the pleading was not filed under that application and omits the file number from the caption.) Holland subsequently filed to renewal the licenses for MRA-challenged Station WQEU734 (FCC File No. 0007188319), but MRA has not opposed that application.

III. DISCUSSION

9. *MRA Petitions.* Section 1.106(b)(1) of the Commission's Rules provides that a petition for reconsideration filed by a person who is not a party to the proceeding "shall state with particularity the manner in which the person's interests are adversely affected by the action taken, and shall show good reason why it was not possible for him to participate in the earlier stages of the proceeding."[25] The Bureau provided public notice of the involuntary assignment applications prior to accepting them.[26] MRA does not explain why it did not oppose the assignment applications at that time. We therefore agree with Holland[27] that the petition for partial reconsideration is defective.[28]

10. We note, however, that MRA could file an informal request for Commission action pursuant to Section 1.41 of the Commission's Rules[29] seeking termination of the 31 licenses on the ground that they cancelled automatically for permanent discontinuance of operation.[30] There is no time limit on such requests, and they are not subject to standing or other procedural requirements.[31] We conclude, therefore, that for reasons of administrative efficiency, it is in the public interest for us to consider the merits of MRA's petition.[32]

11. Pursuant to Section 90.157 of the Commission's Rules, a station license cancels automatically upon permanent discontinuance of operations, *i.e.*, when the station has not operated for one year or more.[33] MRA argues that 31 of the licenses had automatically cancelled for permanent discontinuance before the assignment applications were filed in 2014. In support, it submits a declaration from Kurian stating "from personal knowledge that none of these Stations has been constructed or operational since at least June 30, 2012."[34] MRA also attached corroborating information regarding the authorized locations of some of the licenses to the effect that Kurian had no operations at those sites.[35]

12. Absent conflicting evidence, we credit the declaration of a licensee regarding a station's

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[25] 47 C.F.R. § 1.106(b)(1).

[26] *See Wireless Telecommunications Bureau Assignment of License Authorization Applications, Transfer of Control of Licensee Applications, De Facto Transfer Lease Applications and Spectrum Manager Lease Notifications, Designated Entity Reportable Eligibility Event Applications, and Designated Entity Annual Reports Action*, Public Notice, Report No. 9810 (WTB rel. Aug. 6, 2014).

[27] *See* Holland PFR Opposition at 5-6.

[28] *See, e.g., Channel 23 Limited Partnership*, Memorandum Opinion and Order, 29 FCC Rcd 15073, 15074, para. 5 (2014).

[29] 47 C.F.R. § 1.41.

[30] *See, e.g., Warren Havens*, Order, 30 FCC Rcd 4642 (WTB MD 2015).

[31] *See, e.g., AT&T and DirecTV*, Memorandum Opinion and Order, 30 FCC Rcd 9131, 9146, n.90 (2015); *Warren C. Havens*, Memorandum Opinion and Order, 28 FCC Rcd 16261, 16268, para. 18 & n.60 (2013).

[32] *See, e.g., Cheektowaga-Sloan Union Free School District*, Order on Reconsideration, 20 FCC Rcd 1851, 1854, n.29 (WTB PSCID 2005) (citing *Goosetown Enterps., Inc.*, Memorandum Opinion and Order, 16 FCC Rcd 12792, 12794-95, para. 7 (2001)); *Frank R. Michalak*, Order on Reconsideration, 19 FCC Rcd 1897, 1897, para. 1 (WTB PSCID 2004) (same). We therefore need not address Holland's other procedural objections to the MRA PFR. *See* Holland PFR Opposition at 1-5.

[33] 47 C.F.R. § 90.157(a).

[34] *See* MRA PFR at "Declaration of Pappammal Kurian" at 1.

[35] *See* MRA PFR at "Declaration of Mark J. Abrams" and "Declaration of Joyce Peters."

construction and operational status.[36] Holland's unsupported speculation[37] about Kurian's motives for making the declaration do not constitute conflicting evidence.[38] We therefore conclude on the record before us that the 31 licenses automatically cancelled for permanent discontinuance of operations before Holland filed the involuntary assignment application. A license that has cancelled automatically no longer exists and cannot be assigned.[39] Consequently, we grant MRA's petition for partial reconsideration of the involuntary assignment applications, and will update the Commission's Universal Licensing System (ULS) to reflect the cancellation of the 31 licenses. Applications to renew the challenged licenses will be dismissed once the licenses are cancelled in ULS, so we dismiss as moot MRA's petition to dismiss or deny those applications.

13. *Holland Waiver Request.* To obtain a waiver of the Commission's rules, a petitioner must demonstrate either that (i) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the present case, and that a grant of the waiver would be in the public interest;[40] or (ii) in view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest or the applicant has no reasonable alternative.[41] Based on the record before us, we conclude that Holland has presented sufficient facts to meet the standard for grant of the requested waivers in part as specified below.

14. Cancelled and Expired Licenses. We deny Holland's request for reinstatement of the cancelled licenses, and grant a waiver to permit late renewal of a portion of the expired licenses.

15. As noted above, Kurian filed applications to cancel two licenses and allowed nine others to expire and one to cancel automatically for permanent discontinuance of operations before the TRO was issued. We previously have declined to set aside actions regarding the Kurian licenses that were taken before the TRO was issued since such matters do not implicate the Commission's general policy of accommodating court decrees.[42] Because no court order prohibited Kurian from cancelling those licenses or letting them expire or cancel automatically, we will not set aside the cancellations of the cancelled licenses or permit Holland to file untimely renewal applications for the expired ones.

16. Another 29 licenses expired between the issuance of the TRO and the appointment of Holland as receiver. Holland argues that Kurian's failure to renew the licenses violated her obligations

[36] *See, e.g., 2013 Kurian Order*, 28 FCC Rcd at 11027, paras. 5-7; *Pappammal Kurian and Thomas Kurian*, Order and Order Proposing Modification, 26 FCC Rcd 15177, 15178, para. 3 (WTB MD 2011) (*2011 Kurian Order*), *aff'd*, Order on Reconsideration and Order of Modification, 27 FCC Rcd 13516 (WTB MD 2012), *recon. granted on other grounds*, 28 FCC Rcd 11025 (WTB MD 2013); *Pappammal Wellington Kurian*, Order on Reconsideration, 22 FCC Rcd 18660, 18662, para. 5 (WTB MD 2007).

[37] *See* Holland PFR Opposition at 6-8.

[38] *Alliance Communications Group*, Order on Reconsideration, 30 FCC Rcd 10197, 10198, para. 4 (WTB MD 2015).

[39] *See A-1-A Repeater Company*, Memorandum Opinion and Order, 16 FCC Rcd 9748, 9750, para. 7 (2001) (grant of assignment application set aside; Commission holds there was no authorization to assign because license had automatically cancelled).

[40] 47 C.F.R. § 1.925(b)(3)(i).

[41] 47 C.F.R. § 1.925(b)(3)(ii).

[42] *See Pappammal Kurian* et al., Order on Further Reconsideration and Second Order on Further Reconsideration, 30 FCC Rcd 1125, 1127, para. 7 (WTB MD 2015), *aff'g* Order and Order on Reconsideration, 29 FCC Rcd 4994, 4995-96, para. 6 (WTB MD 2014); *Pappammal Kurian* et al., Order and Order on Reconsideration, 29 FCC Rcd 12699, 12700, para. 5 (WTB MD 2014); *Pappammal Kurian and Thomas Kurian*, Order on Further Reconsideration, 29 FCC Rcd 5384, 5385-86, para. 6 (WTB MD 2014).

under the TRO and preliminary injunction.[43] We disagree. The language of the TRO and preliminary injunction prohibited Kurian from transferring or otherwise disposing of any Commission licenses, but did not set forth any affirmative obligation to renew or otherwise preserve them. Consequently, the expiration of those licenses does not appear to violate any court order, and thus does not implicate the Commission's general policy of accommodating court decrees. We therefore deny the request with respect to these licenses.

17. In contrast, the receivership order required Kurian to take affirmative actions to enable Holland to seek Commission approval to take control of the licenses. Her refusal, until after she was found in contempt of court, to execute powers of attorney or turn over other information so that Holland could file the assignment applications contravened the court's order. Kurian's lack of cooperation impeded Holland from filing timely renewal applications, thereby leading to the expiration of six licenses. Holland cannot be faulted for having been improperly prevented from renewing the licenses despite his reasonable efforts.[44] Therefore, with respect to these licenses,[45] we grant Holland a waiver of the requirement that renewal applications be granted on or before the expiration date.[46] We will accept applications to renew these licenses if they are filed within 30 days from the release date of this *Order and Order on Reconsideration*.[47] A copy of this *Order and Order on Reconsideration* shall be submitted with the renewal applications.

18. Waiver of Construction and Operational Requirements. With respect to the six expired licenses for which we grant relief above,[48] and the 38 active licenses currently held by Holland (*i.e.*, the 69 assigned licenses less the 31 license that we conclude above have automatically cancelled),[49] we grant

[43] *See* Waiver Request at 8.

[44] *See, e.g.*, *Henry Zappia*, Order on Reconsideration, 18 FCC Rcd 13118, 13120-21 ¶ 7 (WTB PSPWD 2003) (granting a waiver of the license renewal requirements to the holder of an expired license, based on the thwarting of his efforts to file a timely renewal application by an adversarial third party acting in contravention of a court order).

[45] Specifically, Stations WPMX234, WQAH890, WQAJ377, WQAJ503, WQAJ984, and WQAJ986. We note that Station WPMX234 was authorized for centralized trunked operations, which are not required to monitor for a signal from another system prior to transmitting. *See* 47 C.F.R. § 90.187. Co- or adjacent channel stations may have been licensed in the vicinity after the license for Station WPMX234 expired. Consequently, we will renew the license on the condition that the station must employ equipment that prevents transmission if a signal is present on that frequency from another system if that system was authorized between March 5, 2014 and the date the license is renewed and the system is an affected licensee pursuant to 47 C.F.R. § 90.187(d)(1), unless the licensee of Station WPMX234 obtains the written consent of that system's licensee.

[46] 47 C.F.R. § 1.949(a).

[47] *See 2011 Kurian Order*, 26 FCC Rcd at 15182, para. 16 (citing *Biennial Regulatory Review – Amendment of Parts 0, 1, 13, 22, 24, 26, 27, 80, 87, 90, 95, and 101 of the Commission's Rules to Facilitate Development and Use of the Universal Licensing System in the Wireless Telecommunications Service*, Memorandum Opinion and Order on Reconsideration, 14 FCC Rcd 11476, 11486, para. 22 (1999) (renewal applications that are filed up to thirty days after the expiration date of the license will be granted *nunc pro tunc* if the application is otherwise sufficient under our rules)); *Jose N. Francis,* et al., Letter Order, 24 FCC Rcd 4834, 4839, n.36 (WTB MD 2009).

[48] None of these licenses is among the 13 cancelled or expired licenses regarding which MRA opposes the waiver request, so we need not address the remaining issues raised in the MRA Waiver Opposition.

[49] Specifically, Stations WPRH552, WPRH553, WPRH565, WPRH761, WPRS537, WPRS628, WPRS629, WPST296, WPTA867, WPTF380, WPTI444, WPTI533, WPTN253, WPTT670, WPTX917, WPTX930, WPIA397, WPUA398, WPIF945, WPUH948, WPUN311, WPUN331, WPUN390, WPUV417, WPUV490, WQAN731, WQAQ609, WQAT850, WQAV571, WQAV860, WQAY262, WQAY263, WQBH646, WQBJ794, WQBP266, WQCB320, WQCH480, and WQFL329.

in part Holland's request for waiver of Sections 90.155[50] and 90.157 of the Commission's Rules. Holland requests waivers to allow him 18 months to arrange sale of the licenses, and an additional year for the assignees to bring the stations into operation. We conclude that one year, which coincides with the construction and operational requirements for most Part 90 licenses,[51] constitutes a reasonable opportunity to bring the stations back into operation.[52] Further relief would frustrate the purpose of the construction and operational requirements, which is to ensure the timely and efficient use of spectrum.[53] That Holland is acting on behalf of Kurian's creditor does not make additional relief appropriate.[54]

19. We therefore grant a temporary waiver of the construction and operational requirements for a period of one year from release date of this *Order and Order on Reconsideration*, to allow these 44 stations to be brought back into operation. The one-year period will not be tolled or reset upon any assignment of the licenses.[55] Each license will be deemed to have cancelled automatically unless the licensee notifies the Bureau that the station was brought into operation within the one-year period.[56] After that period ends, we will update ULS to reflect the cancellation of any license that was not reported by the licensee to be operational.

IV. CONCLUSION AND ORDERING CLAUSES

20. For the reasons explained above, we grant in part the relief requested by Holland with respect to the 116 former Kurian licenses at issue.

21. Accordingly, IT IS ORDERED, pursuant to Sections 4(i), 303(r), and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(r), 405, and Section 1.106 of the Commission's Rules, 47 C.F.R. § 1.106, that the Petition for Partial Reconsideration filed by Mobile Relay Associates on October 7, 2014, IS GRANTED TO THE EXTENT THAT the Commission's licensing records SHALL BE MODIFIED to reflect the cancellation of the licenses for Stations WNXG425, WPOZ668, WPRH562, WPRH760, WPRJ317, WPRJ618, WPRJ714, WPRJ815, WPRK215, WPRK286, WPRK711, WPRK946, WPRL297, WPRM344, WPSR462, WPSR875, WPTF275, WPTF276, WPTN279, WPTR503, WPTY595, WPUA346, WPUA453, WPUB270, WPUD601, WPUD821, WPUH708, WPUR914, WPXH935, WQUE734, and WQGU967.

22. IT IS FURTHER ORDERED, pursuant to Sections 4(i), 303(r), and 309(d) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(r), 309(d), and Section 1.939 of the Commission's Rules, 47 C.F.R. § 1.939, that applications FCC File Nos. 0006953368, 0006953371-72, 0006953374-82, and 0007188319 SHALL BE DISMISSED, and the Petition to Dismiss or Deny filed by Mobile Relay Associates on October 23, 2015, IS DISMISSED AS MOOT.

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[50] 47 C.F.R. § 90.155(a) (generally requiring that private land mobile radio stations be placed in operation within 12 months from the date of authorization).

[51] *See* 47 C.F.R. §§ 90.155(a), 90.157(a).

[52] *See 2011 Kurian Order*, 26 FCC Rcd at 15182, para. 15.

[53] *See, e.g., Longhorn Communications Inc.*, Order on Reconsideration, 29 FCC Rcd 8200, 8206, para. 14 (WTB MD 2015) (citing 47 U.S.C. § 309(j)(4)(B)).

[54] *See FiberTower Spectrum Holdings LLC*, Memorandum Opinion and Order, 27 FCC Rcd 13562, 13576, para. 36 (WTB 2012), *vacated on other grounds*, *FiberTower Spectrum Holdings, LLC v. FCC*, 782 F.2d 692 (D.C. Cir. 2015).

[55] *See* 47 C.F.R. § 1.946(c)(3) (construction extensions will not be granted because the licensee undergoes a transfer of control or intends to assign the authorization, or solely to allow a transferee or assignee to complete facilities that the transferor or assignor failed to construct).

[56] Notification may be provided by letter or pleading submitted via ULS.

23. IT IS FURTHER ORDERED, pursuant to Sections 4(i), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(g), 303(r), and Section 1.925 of the Commission's Rules, 47 C.F.R. § 1.925, that the Conditional, Limited Request for Waivers filed by William M. Holland on March 12, 2015 IS GRANTED TO THE EXTENT SET FORTH ABOVE AND IS OTHERWISE DENIED.

24. IT IS FURTHER ORDERED that Sections 1.949(a), 90.155(a), and 90.157(a) of the Commission's Rules, 47 C.F.R. §§ 1.949(a), 90.155(a), and 90.157(a), ARE WAIVED to the extent set forth above.

25. This action is taken under delegated authority pursuant to Sections 0.131 and 0.331 of the Commission's Rules, 47 C.F.R. §§ 0.131, 0.331.

FEDERAL COMMUNICATIONS COMMISSION

Scot Stone
Deputy Chief, Mobility Division
Wireless Telecommunications Bureau

John J. Schauble
Deputy Chief, Broadband Division
Wireless Telecommunications Bureau

DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 9

From: Atelesaur@cs.com
Sent: Wednesday, December 26, 2007 5:48 PM
To: warren.havens@sbcglobal.net; jstobaugh@telesaurus.com; rosman@bfesf.com; Atelesaur@cs.com
Subject: Response to your letter of Dec. 23 regarding License donations
December 26, 2007

To Telesaurus VPC , GB , AMTS, et al.

Dear Warren and Jimmy:

This letter is in response to Warren's letter/email of Sunday evening, December 23, 2007. In the letter, Warren asserts that I, by my December 20, 2007 letter, objected to the license donation contemplated in the November 4, 2007 and December 4, 2007 letters from Warren to members of the Telesaurus LLCs. First off I want to state that Warren was in error stating that I did not timely reply. He invited me to repond, and I did so timely "by" the 20th. He also threatened to sue me for millions of dollars in damages if I did not agree with him.

I want to make clear that I have not objected to the donation, but rather expressed my concerns regarding the license donations and lack of information concerning the license donations. While it is apparent that the donation has been contemplated for quite some time (Skybridge Spectrum Foundation was formed on December 27, 2006 - one year ago), I was informed of the proposed transaction on November 3, 2007. Then, in a December 4, 2007 letter, it was requested that I ask questions or make comments on the transaction by December 20, 2007. I was in depositions the week of December 12th as he well knows and only had one week to really address his letter.

As you know, I have not been provided with final tax returns or supporting financial materials for the past three (3) years, including information about net proceeds from license sales and therefore don't really understand what tax liability the LLCs presently face. I therefore do not have a good understanding of the possible tax benefits of the proposed donation. I also do not have full information about how the donation to a non-profit provides relief from construction requirement deadlines. If the capital gains tax is 15%, why not just pay the taxes ?

Based on the above, I can only rely on Warren's reports and the representations made therein. Based on those reports and the representations made therein, and Warren's follow up letter of December 23rd, I do not object to the license donations detailed in the November 4 and December 4, 2007 letters.

I understand that Warren is trying to complete the donation, is dealing with other LLC requirements and that he intends to take some vacation time too. As I have taken time out of my post Christmas week travel with my family to respond to you quickly, On the first week of the new year, I would like you to provide me with more detailed information regarding the tax implications of the donations , approximate net sales figure proceeds for 2004,2005, 2006 and 2007, and what the donations mean with respect to build requirements.

I trust that this letter should satisfactorily respond to yours of December 4, 2007 and December 23, 2007. Nothing in this letter of should be construed as a waiver of my legal rights.

Respectfully,

Arnold Leong

DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 10

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In re **MARITIME COMMUNICATIONS/LAND MOBILE, LLC** Participant in Auction No. 61 and Licensee of Various Authorizations in the Wireless Radio Services Applicant for Modification of Various Authorizations in the Wireless Radio Services Applicant with ENCANA OIL AND GAS (USA), INC.; et al. For Commission Consent to the Assignment of Various Authorizations in the Wireless Radio Services	EB Docket No. 11-71 File No. EB-09-IH-1751 FRN: 0013587779 Application File Nos. 0004030479, 0004144435, 0004193028, 0004193328, 0004354053, 0004309872, 0004310060, 0004314903, 0004315013, 0004430505, 0004417199, 0004419431, 0004422320, 0004422329, 0004507921, 0004153701, 0004526264, 0004636537 & 0004604962
In re **MARITIME COMMUNICATIONS/LAND MOBILE, LLC** Participant in Auction No. 61 and Licensee of Various Authorizations in the Wireless Radio Services and **CHOCTAW HOLDINGS, LLC** Applicant for Assignment of Various Authorizations in the Wireless Radio Services	EB Docket No. 13-85 FRN: 0013587779 Application File No. 0005552500

To: The Commission

Petition To Stay Or Hold In Abeyance
The Issuance Of A Hearing Designation Order

INTRODUCTION

Susan L. Uecker ("Receiver") was appointed by the Superior Court of California, Alameda County, in November 2015, to control the assets of several entities that were previously controlled by Warren Havens ("Havens").[1] The Receiver submits this Petition to inform the Federal Communications Commission ("FCC" or "Commission") of her position regarding EB Docket No. 11-71. The Receiver submits this brief in the context of her role as a neutral agent of the California Superior Court with the responsibility to preserve Receivership assets for the benefit of the parties before the Court and creditors of the Entities.

The goals of the Court and the FCC can be best served if two things happen in this matter. First, final resolution of Docket No. 11-71 is needed.[2] The Receiver controls spectrum where there is uncertainty regarding the site license holdings of Maritime Communications/Land Mobile, LLC ("MCLM"), and that uncertainty is a significant obstacle to transactions that would facilitate use of AMTS spectrum by railroads.

Second, the Receiver urges the Commission to stay or hold in abeyance the issuance of a hearing designation order ("HDO") that would commence a proceeding to determine whether Havens and the Entities are qualified to hold Commission licenses. Proceeding with the HDO

[1] The Receiver was appointed to control the following entities: Environmentel LLC, Verde Systems LLC, Intelligent Transportation and Monitoring Wireless LLC, Telesaurus Holdings GB LLC, and V2G LLC (collectively, the "Entities"). She was also appointed to control Skybridge Spectrum Foundation ("Skybridge"), but on March 11, 2016, Skybridge, through its president, Warren Havens, filed a Voluntary Petition for Bankruptcy under Chapter 11 of the Bankruptcy Code in the United States Bankruptcy Court for the District of Delaware, Case No. 16-10626. Due to the automatic stay in bankruptcy, the Receiver is not in control of Skybridge as of March 11, 2016 and cannot take a position on Skybridge's behalf. The Receiver will report any change in Skybridge's status as appropriate.

[2] The Receiver recognizes that Docket No. 11-71 is stayed pending the outcome of Docket No. 13-85. But it is the Receiver's understanding that Docket No. 13-85 is now fully-briefed and ripe for the Commission's decision.

would have a profoundly negative effect on the Receiver's court-directed task of preserving the assets of the Entities and would likewise halt her efforts to get AMTS spectrum held by the Entities into the hands of railroads that have a congressionally-imposed deadline to implement PTC.

The Receiver understands that the FCC places a high priority on the deployment of AMTS spectrum in support of Positive Train Control ("PTC"), an important railroad safety technology designed to reduce accidents from human error. The Receiver believes that she can work to be part of a solution that achieves important goals of both the FCC and the California Superior Court, but only if the Commission stays or holds in abeyance the issuance of an HDO regarding the qualifications of Havens and the Entities to hold spectrum licences.

BACKGROUND

1. This Proceeding And Judge Sippel's Order

This proceeding began in 2011 to address questions that had been raised about the fitness of MCLM to hold FCC licenses. These issues were apparently raised in large part by Havens and the Entities. The Entities stood to benefit from determinations that adversely affected MCLM, as certain site licenses held by MCLM encumber geographic licenses held by the Entities.

On April 22, 2015, FCC Chief Administrative Law Judge Richard L. Sippel entered an order in this proceeding certifying to the Commission the question of whether it should initiate a separate hearing to determine whether Havens and the Entities are qualified to be FCC licensees based on Havens' conduct before the Commission (the "Order"). The Commission is currently considering whether to issue a hearing designation order ("HDO") based on Judge Sippel's Order.

2. The California Court Appoints The Receiver

Following the Order, Dr. Arnold Leong ("Leong") sought appointment of a receiver for the Entities in a proceeding in the Superior Court of California, County of Alameda. Leong, an investor in some of the Entities, is the plaintiff and cross-defendant in an arbitration proceeding with Havens and the Entities that has been pending since 2002. Leong justified the relief he sought in large part on the basis that Havens' conduct before the FCC jeopardized the licenses held by the Entities. He claims beneficial interest in those licenses through his interest in the Entities.

On November 16, 2015, Judge Frank Roesch of the Superior Court issued an order appointing Susan L. Uecker to serve as receiver in the case of *Leong v. Havens, et al.* ("Receivership Order").[3] The Receivership Order required Ms. Uecker to take control of the assets of the Entities and Skybridge, which together hold more than 5,000 FCC licenses.

Leong's amended complaint and Havens' counterclaim are the subject of ongoing arbitration proceedings that are outside of the Receiver's purview. Once the arbitration is completed, the Court will determine what happens to the Entities and their assets. In the meantime, the Receiver is tasked with preserving those assets for the benefit of the Entities' creditors and the parties to the underlying arbitration.

[3] Case No. 2002-070640.

3. The Receiver's Activity

On December 17, 2015, the Receiver filed applications for FCC consent to the involuntary transfer of control of the Entities' FCC licenses and related spectrum leases to her in her capacity as Receiver.[4] The FCC granted those applications on February 6, 2016.

The Receiver has also taken control of various pending litigation matters involving the Entities, and she has received claims from various creditors of the Entities.

Upon her motion, the Court instructed the Receiver by order dated February 26, 2016, that she had the power to market and sell various MAS, LMS and paging licenses, subject to the Court's and the Commission's approval.[5] She anticipates filing in the near future a request for instructions requesting that the Court also grant her the power to market and sell AMTS licenses held by the Entities, specifically to facilitate transactions that will support PTC implementation.

In short, the Receiver is attempting to operate the Entities in a manner consistent with the Court's orders and the FCC's orders, guidance, and policies.

4. The Receiver Spectrum Assets Implicate Important Public Interests

The spectrum controlled by the Receiver has important uses that implicate the public interest. The Receiver understands that the deployment of PTC is a high priority for the Commission, and with good reason. As featured in a recent *New York Times Magazine* article,[6]

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[4] The file numbers for those applications are as follows: Environmentel LLC (File No. 0007061898, as amended); Environmentel-2 LLC (File No. 0007087125); Intelligent Transportation & Monitoring Wireless LLC (File No. 0007060862); Telesaurus Holdings GB LLC (File No. 0007060898); V2G LLC (File No. 0007061828); and Verde Systems LLC (File No. 0007061808, as amended).

[5] Certain of these licenses are owned by Skybridge Spectrum Foundation and are not currently under the Receiver's control due to Skybridge's March 11, 2016 bankruptcy filing.

[6] *See* M. Shaer, *The Wreck of Amtrak 188, What Caused the Worst American Rail Disaster in Decades?*, N.Y. Times Magazine, Jan. 26, 2016.

the slow deployment of PTC in the United States may have played a significant role in the worst American rail disaster in decades when Amtrak 188 derailed outside Philadelphia on May 12, 2015, killing eight people and injuring more than 200 others.[7] Indeed, according to the National Transportation Safety Board, since 1970 there have been more than 170 rail accidents across the nation with nearly 300 fatalities, more than 6,500 injuries, and costing millions of dollars, that could have been prevented or mitigated by PTC.[8]

The Receiver is now in control of 17 AMTS licenses[9] suitable for supporting PTC technology across wide geographic areas in the United States. She is currently pursuing transactions that will facilitate deployment of that spectrum for PTC. As soon as possible, she will seek Court approval of those transactions so that transfer applications may be filed and considered by the Commission. If the Court grants her request for instructions to do so, she will make facilitating PTC-related transactions her highest priority. Such sales will facilitate the railroads' compliance with the federal *Rail Safety Improvement Act of 2008*,[10] which, as amended, mandates that railroads implement PTC before December 31, 2018.[11]

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[7] Nat'l Transp. Safety Bd., Preliminary Report on Amtrak 188 (Accident ID No. DCA15MR010) (2016).

[8] *In the Matter of Metro. Transp. Auth.*, 2016 WL 633361, at ¶ 60 (Feb. 16, 2016) (internal quotation marks omitted).

[9] These 17 AMTS licenses are held by Environmentel LLC, Environmentel-2 LLC, Verde Systems LLC, and Intelligent Transportation & Monitoring Wireless LLC. Exhibit A lists the call signs for these licenses by licensee.

[10] Pub. L. No. 110-432, 122 Stat. 4848 (2008).

[11] Surface Transportation Extension Act of 2015, Pub. L. No. 114-73, § 1302, 129 Stat. 568, 576 (2015).

Likewise, the Receiver controls important LMS spectrum. The Commission is well aware of important uses of LMS, such as enhanced geolocation abilities that would allow, for example, first responders to pinpoint an emergency in a particular floor of a multi-story building.[12]

But if the FCC were to issue an HDO, the Receiver's ability to get these important assets into the hands of users who will deploy them in furtherance of the public interest would be effectively destroyed because of the *Jefferson Radio* doctrine, which holds that an FCC license may not be assigned or transferred when the licensee's qualifications to hold it are in issue.[13]

ARGUMENT

I. The Resolution Of Docket No. 11-71 Is In The Public Interest.

A determination of whether MCLM should hold any FCC licenses, the main issue in Docket No. 11-71, is stayed pending a determination of whether *Second Thursday* relief is warranted in Docket No. 13-85. The Receiver need not add further to the extensive record in these proceedings.

If MCLM is deemed unfit to hold FCC licenses in Docket No. 11-71 and its licenses are terminated, PTC transactions will be facilitated in those areas where the Entities' geographic AMTS licenses are encumbered by MCLM site licenses. Alternatively, if *Second Thursday* relief is granted in Docket No. 13-85 and Choctaw becomes the transferee of MCLM's licenses, then the Receiver and parties in the spectrum market would have a different counterparty with whom to negotiate. Currently, the Entities' AMTS spectrum is encumbered and MCLM cannot enter into sales transactions without *Second Thursday* relief. The status quo benefits no one and makes comprehensive solutions for users of AMTS spectrum difficult or impossible to achieve.

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[12] *See In the Matter of Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Serv. Rules*, 28 FCC Rcd. 8555, ¶¶ 2-3 (June 6, 2013).

[13] *Jefferson Radio Corp. v. FCC*, 340 F.2d 781 (D.C. Cir. 1964).

The Receiver does not suggest that the issues before the Commission in these two proceedings are simple. Nevertheless, these issues require resolution so that the AMTS spectrum transactions can be facilitated and PTC technologies can be deployed.

II. Issuance Of An HDO Against Havens And The Entities Would Likewise Frustrate The Commission's Goals Of Spectrum And PTC Deployment.

The issuance of an HDO would bring to a halt the Receiver's efforts to facilitate transactions for and use of the spectrum licenses held by the Entities. Importantly, the 17 AMTS licenses held by the Entities could be sidelined for the entire duration of any HDO proceeding from being part of a PTC solution. Additionally, the interests of the Receivership in having funds to pay expenses of the Receivership and claims of innocent creditors would be impaired.

The *Jefferson Radio* doctrine "prohibit[s] the sale of a station by a licensee whose qualifications are under investigation if issues concerning the licensee's character qualifications remain unresolved or have been resolved adversely to the licensee."[14] The *Jefferson Radio* doctrine acts as a deterrent to licensee misconduct by preventing a licensee from avoiding the loss that would result from the revocation or non-renewal of a license.[15] In short, if the Commission were to issue an HDO to determine whether Havens and the Entities are qualified to hold FCC licenses, the *Jefferson Radio* doctrine would effectively end the Receiver's ability to assign any licenses to third party purchasers – including AMTS licenses to railroads.

The crash of Amtrak 188 on May 12, 2015, less than a month after Judge Sippel's Order, highlights the cost of delays in the implementation of PTC. In the wake of the crash, railroad

[14] *In the Matter of Applications for Assignment of Licenses WSTX(AM) and WSTX-FM, Christiansted, U.S. Virgin Islands; Family Broadcasting, Inc.; Order to Show Cause Why the Licenses for Stations WSTX (AM) and WSTX-FM, Christiansted, U.S. Virgin Islands, Should Not Be Revoked; For Renewal of Licenses for WSTX(AM) and WSTX-FM*, 25 FCC Rcd 7591, 7595-96 (2010).

[15] *Id.*

officials complained that they had been unable to secure the necessary spectrum fast enough to deploy the PTC technology.[16] The issue is that the spectrum needed to deploy PTC has been previously allocated in auctions to private purchasers such as the Entities.[17] One of the most effective ways the FCC can facilitate the deployment of PTC is to encourage railroads to acquire spectrum from existing licensees like the Entities.[18] To that end, since the passage of the *Rail Safety Improvement Act of 2008*, the FCC has worked "closely" with railroads "to identify available spectrum on the secondary market and to approve secondary market transactions quickly."[19]

Prior to the Receiver's appointment, the Entities, through Havens, had engaged in negotiations with at least two companies that are seeking spectrum to implement PTC. Those parties had reached agreement on the material terms for those transactions when the Receiver was appointed. The Receiver has continued to work to bring those transactions to fruition. She anticipates filing applications to assign some of the licenses not affected by the Skybridge bankruptcy as soon as transaction agreements can be completed and approved by the California Court. This is exactly the kind of action that will assist the Commission in achieving its goal of PTC deployment by 2018. Issuance of an HDO against Havens and the Entities would severely undermine the public interest by preventing transactions like this from moving forward.

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[16] *See, e.g.*, M. Flegenheimer et al., *Amtrak Crash Illuminates Obstacles to Plan for Controlling Train Speeds*, N.Y. Times, May 18, 2015.

[17] *See Hearing on Passenger Rail Safety: Accident Prevention and On-Going Efforts to Implement Train Control Technology, Before the U.S. Senate Comm. on Commerce, Science, and Transp.*, 114th Cong. 1 (2015) (statement of Charles Mathias, Assoc. Chief of the Wireless Telecomm. Bureau, FCC).

[18] *Id.*

[19] *Id.* at 1-2.

The Receiver is likewise working to assure preservation and deployment of other spectrum assets, such as licenses for MAS, LMS and paging spectrum, consistent with the instructions of the California Court. The initiation of an HDO proceeding would prevent the Entities' spectrum licenses of all kinds from being put to further public use. This would harm innocent creditors with claims against the Entities as well as the Entities themselves.[20]

The Receiver is mindful that the findings of Judge Sippel and his recommendation for the initiation of an HDO are serious matters.[21] But the delay in spectrum deployment that will result from the issuance of an HDO would be inappropriate, particularly with regard to AMTS spectrum after the tragic loss of life and numerous injuries resulting from the derailment of Amtrak 188. The Receiver submits that such delays would be inconsistent with "the Commission's fundamental obligation to promote safety of life and property through the use of wire and radio communications."[22]

CONCLUSION

It is important for the Commission to reduce the obstacles to deploying the spectrum held by the Entities under the Receiver's control. The Receiver requests that the Commission decide

[20] Dr. Arnold Leong, an investor and former business colleague of Mr. Havens who claims an interest in the Entities, has alleged in *Leong v. Havens* that Mr. Havens acted without authority and against the interests of the Entities. Thus, if these allegations are correct, the Entities and Dr. Leong could be considered victims of Mr. Havens' actions. Mr. Havens vigorously disputes Dr. Leong's allegations. He contends that he has engaged in no wrongdoing and that he was fully authorized in all actions. As an agent of the California Court, the Receiver is neutral as to the outcome of their dispute, which is the subject of an arbitration proceeding.

[21] The Receiver is aware that Havens has filed an appeal of Judge Sippel's Order, and takes no position on the merits of either the Order or Havens' appeal.

[22] *In the Matter of Metro. Transp. Auth.*, 2016 WL 633361, at ¶ 58 (Feb. 16, 2016) (internal quotation marks omitted).

in a reasonable time the matters in Docket No. 11-71 – and by extension, Docket No. 13-85 – as such decisions, no matter what their outcome, will likely facilitate spectrum deployment.

The Receiver also asks the Commission to stay or hold in abeyance the issuance of an HDO until the conclusion of the Receivership. The Receiver stands ready to work with the Commission and make its priorities her priorities as she seeks to provide solutions that will serve the interests of the Commission and the California Court.

Respectfully submitted,

Susan L. Uecker, Receiver

By: /s/ Brian Weimer

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March 18, 2016

CERTIFICATE OF SERVICE

I, Amanda Lanham, hereby certify that on this 18th day of March, a copy of the foregoing Petition to Stay or Hold in Abeyance the Issuance of a Hearing Designation Order was filed with the Commission, served on the parties listed below via First Class U.S. Mail and a courtesy copy was provided via electronic mail.

The Honorable Richard L. Sippel Chief Administrative Law Judge Federal Communications Commission 445 12th St. S.W. Washington, DC 20554	Jeffrey L. Sheldon Levine, Blaszak, Block & Boothby, LLP 2001 L St. NW, Suite 900 Washington, DC 20036 **Counsel for Puget Sound Energy, Inc.**
Pamela A. Kane Michael Engel Enforcement Bureau Federal Communications Commission 445 12th St. S.W. Washington, DC 20554	Charles A. Zdebski Gerit F. Hull Eckert Seamans Cherin & Mellott, LLC 1717 Pennsylvania Avenue NW Washington, DC 20006 **Counsel for Duquesne Light Co.**
Sandra DePriest Maritime Communications/Land Mobile LLC 218 North Lee St. Suite 318 Alexandria, VA 22314	Paul J. Feldman Harry F. Cole Fletcher, Heald & Hildreth, P.L.C. 1300 N. 17th Street – 11th Floor Arlington, VA 22209 **Counsel for Southern California Regional Rail Authority**
Dennis C. Brown 8124 Cooke Court Suite 201 Manassas, VA 20109 **Counsel for Maritime Communications/Land Mobile LLC**	Robert J. Keller Law Offices of Robert J. Keller, P.C. P.O. Box 33428 Washington, DC 20033 **Counsel for Maritime Communications/Land Mobile LLC**
Robert G. Kirk Wilkinson Barker Knauer, LLP 2300 N St., NW Suite 700 Washington, DC **Counsel for Choctaw Telecommunications, LLC and Choctaw Holdings, LLC**	Warren Havens Jimmy Stobaugh 2509 Stuart Street Berkeley, CA 94705

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/s/ Amanda M. Lanham
Amanda M. Lanham

Licensee	Call Sign
Verde Systems LLC	WQCP808
Verde Systems LLC	WQCP815
Verde Systems LLC	WQCP816
Verde Systems LLC	WQCP817
Verde Systems LLC	WQGF308
Environmentel LLC	WQCP810
Environmentel LLC	WQCP811
Environmentel LLC	WQCP812
Environmentel LLC	WQCP813
Environmentel LLC	WQCP814
Environmentel LLC	WQGF313
Environmentel LLC	WQGF314
Environmentel LLC	WQJV762
Intelligent Transportation & Monitoring Wireless LLC	WQGF310
Intelligent Transportation & Monitoring Wireless LLC	WQGF311
Intelligent Transportation & Monitoring Wireless LLC	WQGF312
Environmentel-2 LLC	WQNZ336

DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

EXHIBIT 11

Print Close

Leong vs. Havens

From: **Susan Uecker** (Suecker@ueckerassoc.com)
Sent: Thu 8/04/16 3:25 PM
To: 'Warren Havens' (wrrnvns@gmail.com); 'Warren Havens' (warren.havens@sbcglobal.net); 'Jimmy Stobaugh' (Jimmy.stobaugh@outlook.com)
Cc: 'Norris, Todd' (Todd.Norris@bullivant.com); 'Downs, Andrew' (andy.downs@bullivant.com); 'David DeGroot' (DDeGroot@sheppardmullin.com); 'Geraldine Freeman' (GFreeman@sheppardmullin.com); 'Brian Weimer' (BWeimer@sheppardmullin.com)

Mr. Havens:

We received and reviewed your correspondence (dated July 25, 2016) on the PTC-220 transaction; thank you for providing your feedback. In response to some of the concerns you expressed in this correspondence, we would like to highlight the following points for your consideration:

The PTC-220 transaction is very similar to the deal that you negotiated before the receivership began. In fact, the term sheet you negotiated with PTC-220 served as the starting point for the transaction discussions that have had with PTC-220.

With respect to your concerns as to the purchase price, please note that this reflects the fact that PTC-220 will need to expend considerable resources to remove the relevant encumbrances (*i.e.*, some existing, site-based licenses in the Northeast). If this clearing process is relatively easy, the purchase price will increase to effectively the same level that you apparently agreed to previously with PTC-220.

As to your concerns regarding the sale of spectrum on a full-county basis, we note that this was one of the transaction structures that was specifically included in the original term sheet that you negotiated with PTC-220 and upon which we based our negotiations with PTC-220. We view the fact that it was apparently acceptable to you in the past as strong evidence that it does not present material issues today.

We currently intend to move forward and execute the transaction documents. Of course, the transaction remains subject to the approval of the FCC and the Alameda County Superior Court.

Susan L. Uecker

Uecker &

Associates, Inc.

1613 Lyon Street, Suite A | San Francisco, CA 94115

Phone 415-362-3440 | Fax 415-362-7704

Email suecker@ueckerassoc.com

PROOF OF SERVICE
Arnold Leong v. Warren Havens, et al.
Alameda Superior Court No. 2002-070640

I am employed in the City and County of San Francisco by the law firm of Bullivant Houser Bailey ("the business"), 235 Pine Street, Suite 1500, San Francisco, CA 94104. I am over the age of eighteen (18) and not a party to this action. On August 19, 2016, I served the document entitled:

DECLARATION OF WARREN HAVENS IN SUPPORT OF MOTION TO TERMINATE RECEIVERSHIP

upon the following parties:

PAUL F. KIRSCH JAMES M. ROBINSON Shopoff Cavallo & Kirsch LLP 601 Montgomery Street, Suite 1110 San Francisco, CA 94111 Telephone: 415-984-1975 Facsimile: 415-984-1978 Email: paul@scklegal.com james@scklegal.com **Attorneys for**: Plaintiff ARNOLD LEONG	RICHARD W. OSMAN Bertrand, Fox, Elliot, Osman & Wenzel 2749 Hyde Street San Francisco, CA 94109 Telephone: 415-353-0999 Facsimile: 415-353-0990 Email: rosman@bfesf.com **Attorneys for**: Plaintiff ARNOLD LEONG
GERALDINE FREEMAN DAVID A. DEGROOT Sheppard Mullin Richter & Hampton LLP Four Embarcadero Center, 17th Floor San Francisco, CA 94111 Telephone: 415-434-9100 Facsimile: 415-434-3947 Email: gfreeman@sheppardmullin.com ddegroot@sheppardmullin.com **Attorneys for**: Receiver SUSAN UECKER	

( ) **BY MAIL (CCP §1013(a))**: I am readily familiar with the ordinary practice of the business with respect to the collection and processing of correspondence for mailing with the United States Postal Service. I placed a true and correct copy of the above-titled document in an envelope addressed as above, with first class postage thereon fully prepaid. I sealed the aforesaid envelope and placed it for collection and mailing by the United States Postal Service in accordance with the ordinary practice of the business. Correspondence so placed is ordinarily deposited by the business with the United States Postal Service on the same day.

( ) **BY ELECTRONIC TRANSFER**: I caused all of the pages of the above-entitled document to be sent to the recipient indicated via email at the respective email addresses. This document was transmitted by email and transmission reported without error.

( ) **BY FACSIMILE TRANSMISSION (CCP §1013(e), CRC 2.306)**: I transmitted the document by facsimile transmission by placing it in a facsimile machine (telephone number 415-352-2701) and transmitting it to the facsimile machine telephone number listed above. A transmission report was properly issued by the transmitting facsimile machine. The transmission was reported as complete and without error. A true and correct copy of the transmission report is attached hereto.

( ) **BY OVERNIGHT DELIVERY (CCP §1013(c))**: I am readily familiar with the ordinary practice of the business with respect to the collection and processing of correspondence for mailing by Express Mail and other carriers providing for overnight delivery. I placed a true and correct copy of the above-titled document in an envelope addressed as above, with first class postage thereon fully prepaid. I sealed the aforesaid envelope and placed it for collection and mailing by Express Mail or other carrier for overnight delivery in accordance with the ordinary practice of the business. Correspondence so placed is ordinarily deposited by the business with Express Mail or other carrier on the same day.

( ) **BY PERSONAL SERVICE UPON AN ATTORNEY (CCP §1011(a))**: I placed a true and correct copy of the above-titled document in a sealed envelope addressed as indicated above. I delivered said envelopes by hand to a receptionist or a person authorized to accept same at the address on the envelope, or, if no person was present, by leaving the envelope in a conspicuous place in the office between the hours of nine in the morning and five in the afternoon.

(x) **BY HAND**: Pursuant to Code of Civil Procedure §1011, I directed said envelope to the party so designated on the service list to be delivered by courier this date. A proof of service by hand executed by the courier shall be filed/lodged with the court under separate cover.

( ) **BY PERSONAL SERVICE UPON A PARTY (CCP §1011(b))**: I placed a true and correct copy of the above-titled document in a sealed envelope addressed as indicated above. I delivered each envelope by hand to a person of not less than eighteen (18) years of age at the address listed on the envelope, between the hours of eight in the morning and six in the evening.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct.

Executed on August 19, 2016, at San Francisco, California.

ROBERTA C. BEACH

*****